JOURNAL

of the

INDIAN MEDICAL ASSOCIATION

VOLUME 25 NUMBER 2 CALCUTTA JUNE 16, 1955

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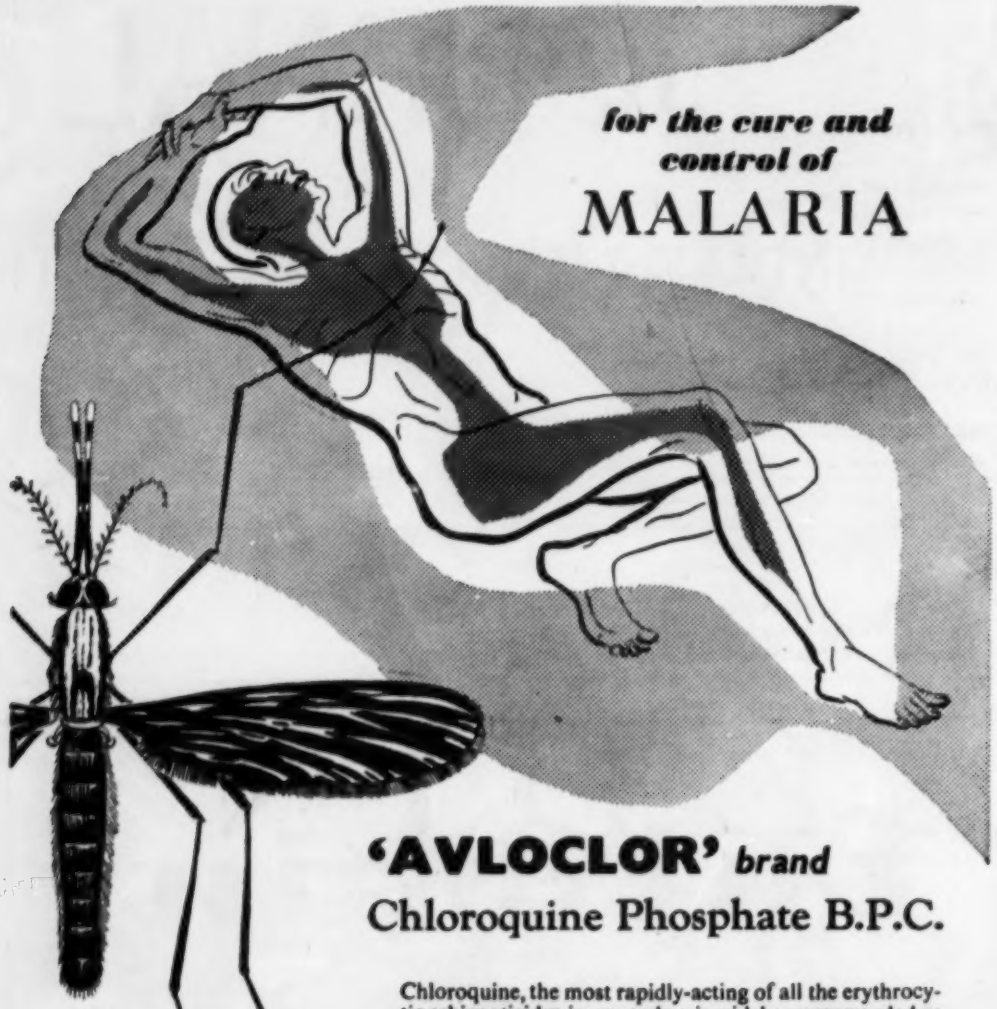

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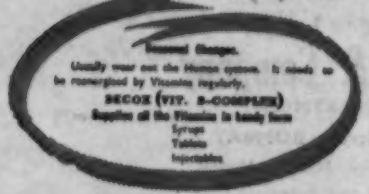

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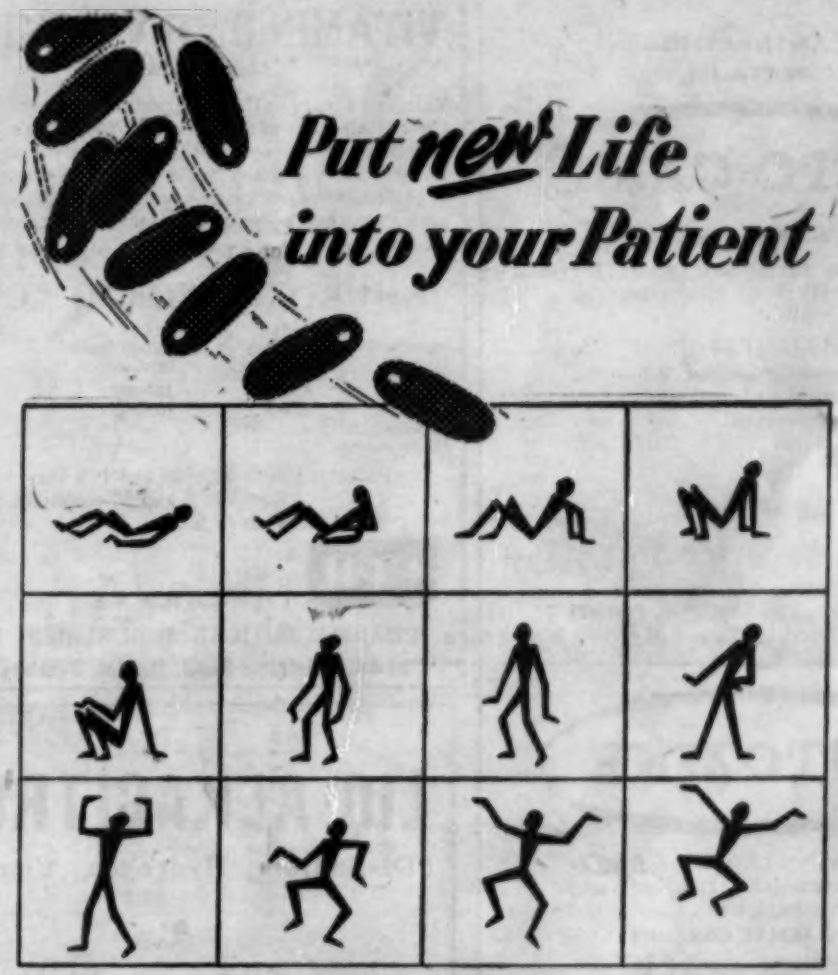

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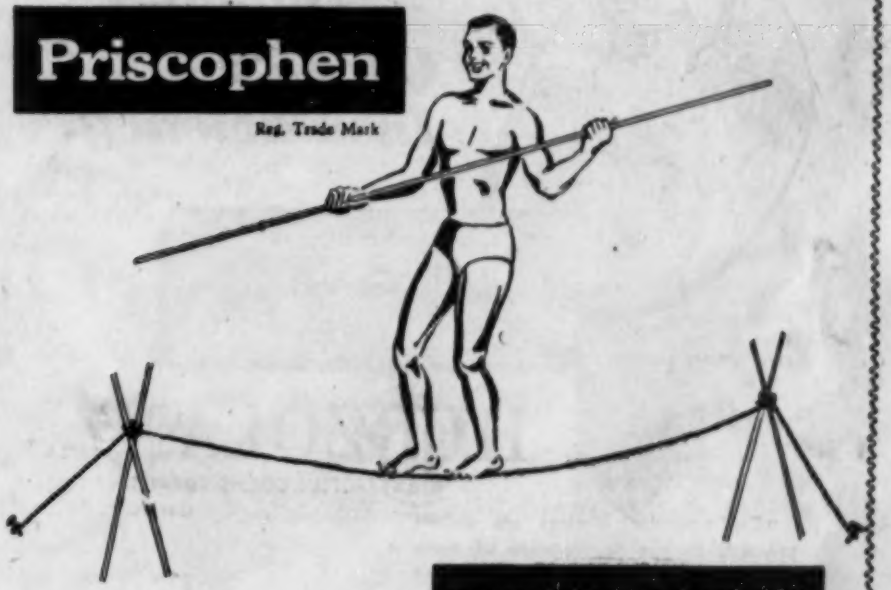

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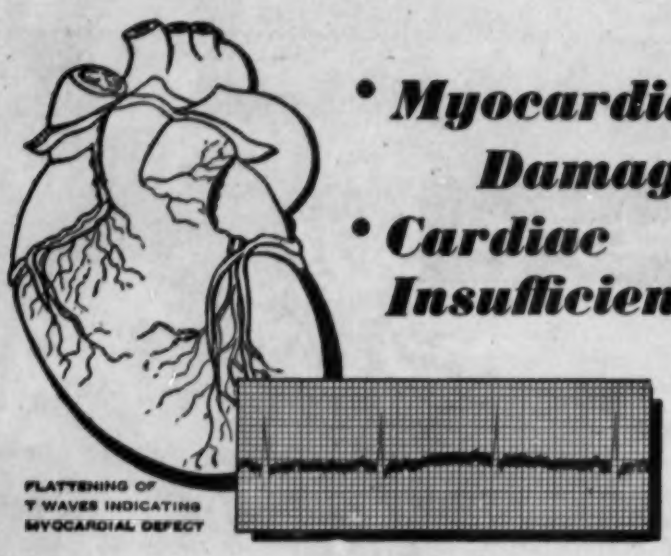

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CALCUTTA–26.

Journal of the Indian Medical Association

Vol. 25, No. 2 | CALCUTTA | June 16, 1955

PUBLISHED TWICE A MONTH

ORIGINAL ARTICLES

SURGICAL TREATMENT OF MITRAL STENOSIS—A REPORT ON 11 CASES

AJIT K. BASU, M.S. (CAL.), F.R.C.S. (ENG.), F.A.C.S.,

Professor of Surgery,

AND

AMALANANDA DAS, M.B., M.R.C.S. (ENG.), M.R.C.P. (LOND.),

Professor of Medicine,

Nilratan Sircar Medical College and Hospitals, Calcutta.

Mitral commissurotomy is now an established procedure for the treatment of selected cases of mitral stenosis. The first operation was performed by Souttar in 1925. From this year onwards, Harken (1948) and Bailey (1949) in America and Brock in England (Baker, 1950) and subsequently many others have performed the operation on a large number of cases with success. The period of follow-up is short but reports on the results have been encouraging. The average operative mortality is now in the neighbourhood of 4 per cent and recurrence of stenosis has occured only in 5 per cent of cases (Wood, 1954). Symptomatic relief has been excellent in a large percentage ; amelioration of disability for a number of years can be expected with confidence in suitable cases.

A report on a small series of cases in this country has recently been published by Datey and Sen (1954). The present communication is on another small series of cases from our centre, in which the results of valvotomy in the last 10 consecutive cases have been very encouraging.

Material and Data

The pre-operative status of the patients and the details of the operative findings have been summarised (Tables 1 and 2). The important points in each of these will be emphasized.

Sex—9 patients were male and 2 female.

Age—2 patients were below 20, 4 between 21 and 30, 4 between 31 and 40 and one above 40 years of age.

Rheumatic history—Significant rheumatic history in the past was obtainable only in six cases.

SYMPTOMS :

Dyspnoea on accustomed exertion was present in all. In 5 cases, it was of severe degree and was also evident at rest in bed. Attacks of occassional acute paroxysmal dyspnoea were also present in all cases. Two cases developed acute dyspnoea coincident with acute pulmonary oedema while waiting for the operation in the hospital.

Attacks of *recurrent haemoptysis* were present in six cases. In none of the cases in this series was a history of previous embolic episode obtained.

PHYSICAL SIGNS :

Cardiac rhythm—The cardiac rhythm was normal in 9 cases. One case had paroxysmal fibrillation in the pre-operative period and another had persistent long-standing fibrillation. Another patient had also suffered in the past from paroxysmal auricular tachycardia.

Diastolic thrill—The typical diastolic thrill over the mitral area was present in 9 cases and so also was the characteristic short and sharp 1st

sound. The so called "opening snap"—a sharp click after the mitral second sound was present in six of our cases. Its importance in determining pliability of the mitral cusps and therefore of operability will be commented upon later.

Diastolic murmur—This was present in all cases and in 8 there was associated presystolic accentuation.

Systolic murmur—This was present in 3 cases and in another a short musical similar murmur was evident.

The second sound in the pulmonary area was split in all cases and its pulmonary component was markedly accentuated. A diastolic murmur of pulmonary incompetence was present in 2 cases. There was evidence of slight aortic incompetence in 2 cases. This has not increased after operation.

Right ventricular hypertrophy—Signs of right ventricular hypertrophy (R.V.H.) as evidenced on palpation by forceful left parasternal thrust was present in 9 cases and in marked degree in 2 cases.

Congestion of lungs—This was present to a greater or lesser extent in 7 of the cases.

Radiological findings—The important points that were particularly taken into account were:

(*a*) The so-called mitralised contour with straightening of the left border and prominence of the pulmonary conus was present in all cases.

(*b*) Aortic knuckle was small in all cases.

(*c*) In the P.A. view, the enlarged left auricular shadow was separately visible as a double contour in 5 cases but in the R.A.O. view, the evidence of pressure on the Ba-filled oesophagus was present in all.

(*d*) The right ventricle appeared to be somewhat enlarged in all cases particularly in its outflow tract.

(*e*) Significant enlargement of the left ventricle was considered to be a contra-indication to operation and was not present in any case. Some overlapping of the vertebral border in the L.A.O. view was present in 4 cases, both in skiagrams as well as in fluoroscopy.

(*f*) Radiological evidence of pulmonary congestion was evident to a lesser or greater degree in all cases. In one case, there was radiological evidence of marked dilatation of pulmonary artery-almost of aneurysmal proportion (Fig. 1A and 1B *vide* Plate). This was later confirmed at operation.

(*g*) Radiological evidence of calcification of the mitral valve was not obtained in any case, although calcification of the cusps was found in 2 cases at operation.

E.C.G.—The broad bifid type of P wave which is often obtained in cases of mitral stenosis with left auricular hypertrophy was present in 7 of our cases. E.C.G. evidence of right ventricular hypertrophy was also present in all cases. Only one case exhibited electrocardiographic evidence of left ventricular hypertrophy.

Operative Procedure

The standard operative technique was followed. With the patient in right lateral position, the thoracic cavity was entered through the bed of excised 5th rib. After retracting the lung backwards and downwards, the pericardium was opened for about 3″ either anterior or posterior to the phrenic nerve. The enlarged auricular appendix was at once seen and felt. Using No. 1 black silk with a half curved atraumatic needle, a purse-string suture was passed around the base of the appendix and a Satinsky clamp was placed across it distal to this suture. An incision of about ½″ long was made on the appendix and the lips of the incision were separated. The tip of the index finger was slowly insinuated through the incision inside the auricle as the clamp was released and the purse-string tightened. Once inside the auricle, the following points were noted by the intra-auricular finger:

(a) Presence or absence of the thrombus, (b) site and size of the mitral orifice, (*c*) pliability or rigidity of the cusps of the mitral valve and presence or absence of calcification, (*d*) any regurgitant jet through the orifice, and (*e*) size of the left auricle and patency of the interatrial septum.

The mitral orifice was next enlarged by the tip of the finger and the posterior commissure was first split. The anterior commissure was usually split by a second attempt. On an average it required 2 or 3 attempts before complete splitting of the 2 commissures was successful and the orificial size became satisfactory. At no time was the intra-auricular finger allowed to obstruct the orifice for more than 2 or 3 seconds.

After commissurotomy, presence of regurgitant stream, if any, was felt for and the finger was gradually extruded out of the auricle as the Satinsky clamp was put back and lastly the purse-string suture was tied and the clamp was finally removed. The lips of the incision in the auricle were separately repaired. The pericardium was very loosely repaired leaving large gaps and the wound was closed in layers leaving an intrapleural stab drain connected with a water seal suction bottle.

TABLE I—SUMMARY OF PRE-OPERATIVE SYMPTOMS, PHYSICAL SIGNS AND LABORATORY FINDINGS

	1. K.N.	2. A.G.	3. P.H.	4. A.D.	5. S.D.	6. K.K.	7. R.D.	8. S.	9. A.B.	10. G.C.	11. S.M.
Rheumatic history ...	nil	nil	nil	+	+	+	+	nil	+	+	nil
Exertional dyspnoea (Duration).	+ 2 years	+ 3 years	++ 3 years	+ 6 months	++ 7 years	++ 1 year	++ 5 years	+ 2½ years	+ 8 years	+ 4 years	+++ 3 years
Paroxysmal dyspnoea ...	+ 1 year	++ 2 years	++ 3 years	+ 4 months	+++ 6 years	+++ 1 year	+++ 9 months	nil	+ 4 years	+ 1 year	++ 1 year
Haemoptysis ...	+ 2 attacks	+ 2 attacks	nil	+	+++ 3 attacks	nil	++ 3 attacks	nil	+	+	+
Short, sharp, 1st sound	+	+	+	+	+	+	+	+	+	+	+
Opening snap ...	–	+	+	+	–	+	+	+	–	+	–
Diastolic thrill ...	+	+	+	+	+	+	+	+	+	+	+
„ murmur ...	+	+	+	+	+	+	+	+	+	+	+
Presystolic accentuation	+	+	+	+	–	–	+	+	+	–	+
Systolic murmur mitral area	+	–	–	–	–	–	+musical	+occasional	+	–	+
Third heart sound ...	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Intensity of second sound in pulmonary area	+	+	+	+	+	++	++	+	+	+	+
Splitting	+	+	+	+	+	++	++	+	+	+	+
Right ventricular hypertrophy		+	+	+	+	+++	++	+	+	++	++
Blood pressure ...	94/70	95/60	100/70	100/64	120/65	108/70	120/70	116/66	90/?	110/92	100/72
Lungs	C	–	C	C	C	C	C	–	–	–	C
Radiology: Cardiothoracic ratio (per cent)		62	52	50	58	62	50	58	50·8	50·2	62·5
Contour of heart ...	M	M	M	M	M	M	M	M	M	M	M
L. A. hypertrophy ...	+	+	+	+	+	+	+	+	+	+	+
Right ventricle ...	+	+	+	+	++	+	+	+	+	+	+
Left ventricle ...	+	+	–	–	–	–	+	–	–	–	+
Pulmonary congestion	+	+	+	+	+	+	+	+	+	+	++
Calcification	Not detected in any patient.										
E.C.G.: "P. mitrale" ...	+	+	+	+	F	–	+	+	+	+	+
R. V. hypertrophy ...	+	+	+	+	+	+	+	+	+	+	+
E.S.R. (mm.)		25	20	11	12·5	6	33	7	6	6	12
Other manifestations ...	Liver+	Diastolic murmur in A.A.	F Congestive failure+	Pulmonary oedema	F Congestive failure+	Liver+ Spleen+ Congestive failure+	Diastolic murmur in A.A. Liver+ Spleen+		Syncopal attack on exertion		Congestive failure +

C—Congestion. F—Fibrillation. M—Mitralised.

TABLE 2—OPERATIVE FINDINGS.

				BEFORE COMMISSUROTOMY									AFTER COMMISSUROTOMY		COMPLICATIONS DURING OPERATION			
S. No.	Name	Age in yrs.	Sex	Date of operation	Lungs	Size of pulmonary artery	Size of Aur. appendix	Size of left auricle	Degree of stenosis	Mitral valve	Calcification	Regurgitant stream	Size of orifice in cm.	Regurgitant stream	Cardiac irregularity	Persistent fall of B.P.	Embolic complication	Lung biopsy
1.	K.B.N.	28	M.	15-12-53	N.	+	+	+	++	Pliable	nil	nil	>2	nil	nil	nil	nil	+
2.	A.G.	16	M.	21-5-54	N.	++	+	+	+++	Thickened but pliable	nil	nil	>2	nil	nil	No	nil	+
3.	P.H.	42	M.	3-6-54	N.	+	+	+ Hypertrophy of wall	++	Thickened but pliable	nil	nil	2	nil	Fibrillation	nil	nil	+
4.	A.D.	24	M.	3-9-54	N.	+	+	+	++	Thickened pliable	nil	nil	>2	nil	nil	nil	nil	+
5.	S.D.	30.	M.	14-9-54	N.	+	+ Firm	+	++	Rigid	+	+	>2	nil	Fibrillation	Temporary hypotension	nil	+
6.	K.K.	30.	F.	27-10-54	Pleural adhesions	++	+	++	+++	Pliable not much thickened	nil	nil	>2·5	nil	nil	nil	nil	+
7.	R.D.	34	M.	1-11-54	N.	+++	+ Hour glass	+	+++	Pliable	nil	nil	>2·5	nil	Fibrillation	nil	nil	+
8.	S.	18	—	29-1-55	N.	++++	+	+	++	Pliable	nil	nil	>2·5	nil	nil	nil	nil	nil
9.	A.B.	26	M.	1-3-55	N.	+	Small	+	++	Pliable	nil	nil	>2	nil	nil	nil	nil	not done
10.	G.C.	25	F.	8-3-55	N.	++	++	++	++	Pliable	nil	nil	>2	nil	nil	nil	nil	Heart failure cells
11.	S.M.	26	M.	26-3-55	N.	++	+	++	+++	Rigid	++	nil	>2·5	nil	Extrasystoles	nil	nil	Not done

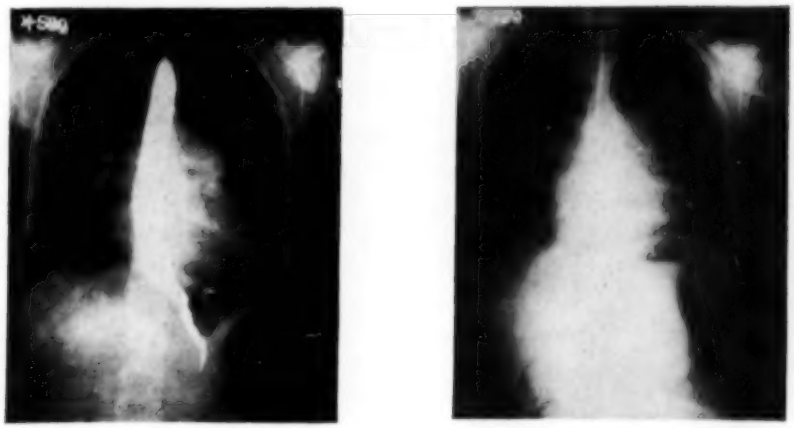

Fig. 1 A and Fig. 1 B—Skiagram P. A. view. Aneurysmal dilatation of pulmonary artery and considerable diminution after operation.

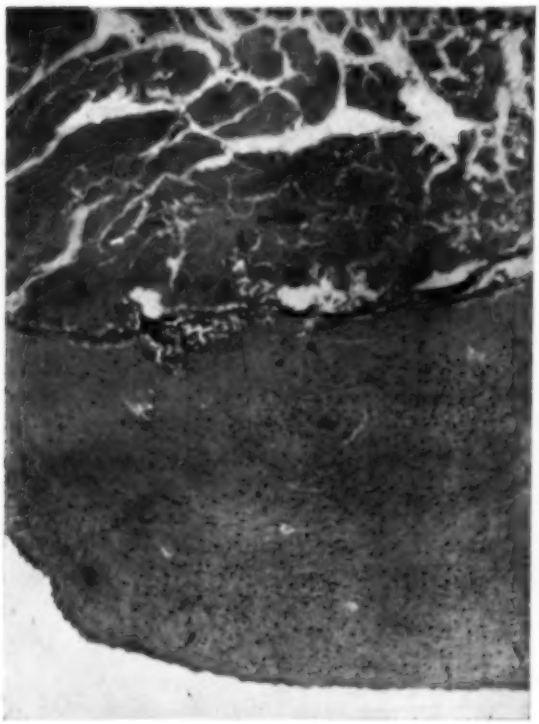

Fig. 2—Microphotograph of auricular biopsy section showing marked subendocardial thickening and fibrosis (H. & E. 300).

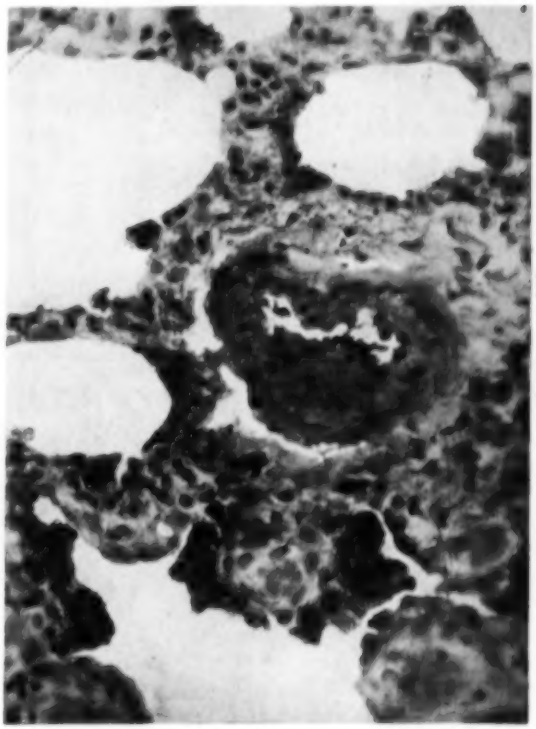

Fig. 3—Microphotograph of lingular biopsy section showing advanced arteriolosclerotic changes with subendothelial thickening and obliteration of arterioles. Also showing many heart failure cells (H. & E. 300).

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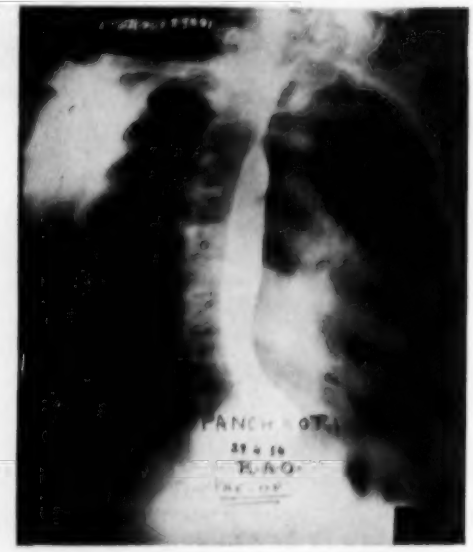


Fig. 4—R. A. O. view skiagram showing impression of the left auricle on barium-filled oesophagus.

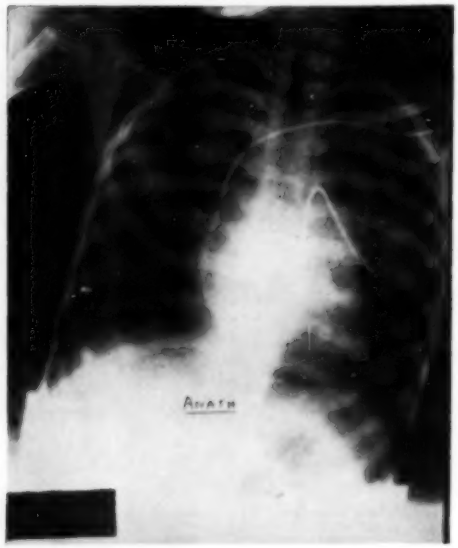


Fig. 5—Skiagram showing the tip of the cardiac catheter wedged in the pulmonary artery to estimate the pulmonary capillary pressure.

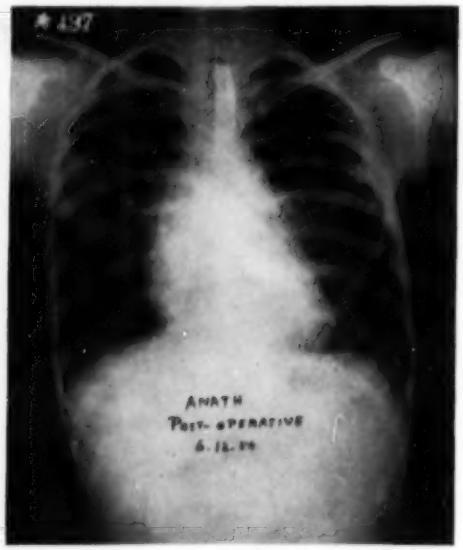


Fig. 6 A and Fig. 6 B—Pre-operative and post-operative P. A. view skiagram showing change in the contour of the left border of the heart after operation and reduction of the over-all size of the heart. Fig. 6 A also shows the left auricular shadow as a double contour.

The Significant Findings before Commissurotomy

Appearance of lungs—The lungs appeared normal in all cases.

Pulmonary artery—In all cases, the pulmonary artery was markedly enlarged and tense. On an average, it appeared to be about twice its normal size. In Case 8, the enlargement was of aneurysmal proportions.

Auricular appendix—This was large in size in 8 cases. In one case, its consistency was firmer than expected although no thrombus was detected inside it. In another case, a peculiar hourglass deformity of the appendix was noted—making the passage of the finger through the auricle extremely difficult.

Thrombus—In this series, thrombi of any significant degree in the left auricle were not present, although there were 2 cases, who were either constantly or intermittently fibrillating. In these two cases, precaution was taken to obstruct the left internal carotid and the right innominate arteries during intracardiac manipulation.

Degree of stenosis—In all cases, the degree of stenosis appeared to be very marked so much so that there was difficulty in actually locating the orifice. In no case would the orifice admit the tip of the index finger prior to commissurotomy. An approximate estimate of the size of the orifice was made at the time of operation. In 6 cases, it was less than 1 cm. × 0·5 cm. and in the other 5 cases, it was less than 1·5 cm. × 0·75 cm.

Mitral valve—In 9 cases, the cusps of the mitral valve were thickened but still pliable to some extent. In 2 cases, the cusps were rigid and markedly calcified and calcification was felt also at the edges of the orifice.

Regurgitant stream—Only in 1 case was regurgitant stream felt by the intra-auricular finger prior to commissurotomy. The regurgitation was considerably lessened after the commissurotomy.

The Significant Findings after Commissurotomy:

Size of the orifice—In all cases after commissurotomy, the index finger could be easily introduced upto the second knuckle joint and the orifice averaged between 2 to 2·5 cm. in diameter. In 3 cases, after one or two ineffectual attempts at splitting the commissures, they gave way suddenly and the orificial size became ample (more than 2·5 cm.).

Regurgitant stream—In no case in this series did we obtain any significant regurgitant stream palpable by the intra-auricular finger after commissurotomy had been accomplished.

Cardiac irregularity during operation—Cases with regular rhythm did not have any significant cardiac irregularities at the time of operation. The irregularities that did occur, were extra systoles of a minor and transient character. 1 per cent procaine solution was used liberally as a topical application on the surface of the heart instead of using it intravenously in the drip as practised in some clinics. 2 cases who were fibrillating preoperatively continued to do so at the time of operation.

Auricular biopsy—In many cases, there were evidences of chronic inflammatory changes in the auricular wall with subendocardial fibrosis and thickening (Fig. 2, *vide* Plate). Aschoff bodies were not found in any case.

Lingular biopsy—In 3 cases there was marked thickening of the pulmonary arterioles with considerable narrowing of the lumen. Heart failure cells were seen in many cases (Fig. 3, *vide* Plate).

Post-operative Complications and their Management

Cardiac arrhythmia—There was considerable cause for anxiety due to persistent cardiac arrhythmia after operation in Case 3. This patient developed paroxysmal auricular tachycardia with the ventricular rate approximating 180 per minute. He was in this state for over 7 days but the B.P. maintained fairly well during this stormy period. He was put at first on digitalis and later quinidine was used successfully and the patient reverted to normal rhythm. Another case developed transient auricular fibrillation for a few hours.

Congestive failure—The first case developed acute pulmonary oedema followed by right-sided congestive failure some hours after the operation and died shortly afterwards. 4 other cases showed signs of lesser degrees of congestive failure as evidenced by prominence of jugular veins, increased venous pressure and basal congestion of the lungs, for which digitalization was necessary. One case was benefited by venesection.

Hypotension—No case showed any significant episode of hypotension in the post-operative period.

Restlessness—3 of the cases became extremely restless shortly after the operation and were controlled with difficulty. Other cases showed minor degrees of restlessness. Sedation was obtained in all cases with small but repeated doses of pethidine hydrochloride (25 to 50 mg.) and intramuscular paraldehyde injections (3 to 5 c.c.).

Post-operative pain—6 cases complained of persistent post-operative pain in the chest wall over the operative site which gradually subsided.

Pyrexia—All the cases had post-operative pyrexia for a few days. Antibiotics were used routinely and no other specific measures were necessary.

Pericarditis—Post-operative pericarditis is a recognised complication and developed in 6 cases. No special treatment is called for or was used except routine antibiotics. Usually the attack subsided within ten days.

Pericardial effusion—One case developed significant pericardial effusion in the post-operative period which took about 2 weeks to subside. Aspiration was not necessary.

Lung complications—Besides Case 1, which died from acute pulmonary oedema, another case developed bilateral pleurisy and was treated with antibiotics. Another case developed pleural effusion on the operated side which, subsided without interference.

The Present Status of the Patients

Case 1 (K.B.N.)—Died few hours after operation.

Case 2 (A.G.)—*Symptomatic relief.* Considerable. The patient is able to walk at a fast pace without discomfort. There has been no recurrence of haemoptysis or cardiac asthma. He has gained 27 lbs. weight since operation.

Physical signs—The diastolic thrill and the presystolic accentuation of the mitral diastolic murmur has disappeared. The aortic diastolic murmur persists but has not increased.

Radiology—There has been some change in the contour of left border of the heart at the pulmonary bay. It was initially convex and has now become slightly concave. Also there has been diminution of the over-all size of the heart.

E.C.G.—The P waves from a bifid type has assumed unifid appearance and is less broad. There is at present no evidence of right ventricular hypertrophy.

Case 3 (P.H.)—*Symptomatic relief.* The patient even now gets occasional attacks of paroxysmal auricular tachycardia (confirmed by E.C.G.). During these attacks, he becomes very ill with dyspnoea, pulmonary oedema and haemoptysis. In between the attacks however, his capacity for ordinary activities including walking on level ground has increased.

Radiology—There has been significant reduction in the size of the heart and the pulmonary bay has become slightly concave.

E.C.G.—There is a change in the character of the P waves in lead II, from broad bifid to unifid type.

Case 4 (A.D.)—*Symptomatic relief.* There has been considerable improvement in this respect and the patient has no discomfort on ordinary activities.

Physical signs—The diastolic thrill and the pre-systolic accentuation of the mitral diastolic murmur has disappeared.

Radiology—There has been a change in the contour of the heart with less prominence of the pulmonary conus. The auricular size is smaller.

E.C.G.—The height and width of the P waves in lead II have been lessened.

Case 5 (S.D.)—*Symptomatic relief.* There has been appreciable symptomatic relief and the patient can walk short distances without discomfort. He was almost completely bed-ridden before operation. His fibrillation is still persistent.

Radiology—There has been no significant change as yet.

E.C.G.—The patient is still fibrillating.

Case 6 (K.K.)—*Symptomatic relief*—The patient shows considerable symptomatic relief and is now able to walk fairly fast without dyspnoea although she was almost bedridden before the operation. She has not had any attack of paroxysmal dyspnoea after operation.

Physical signs—The mitral diastolic murmur has become very faint and the pulmonary diastolic murmur has disappeared. Signs of R.V.H. which were a prominent feature of the case before operation is now much less.

Radiology—The mitralised contour of the left border of the heart shows some imyrovement.

E.C.G.—From broad bifid P waves in lead II, there has been change to pointed unifid type.

Case 7 (R.D.)—*Symptomatic relief.* The patient can now run short distances without undue dyspnoea. There has been no attack of paroxysmal dyspnoea after operation.

Physical signs—The diastolic thrill has disappeared. The diastolic murmur is less intense. The systolic murmur is still present. The aortic diastolic murmur persists. Signs of R.V.H. are much less. Opening snap is present in the mitral area.

Radiology—There has been slight change in the convexity at the pulmonary bay. The size of the right ventricle is smaller.

E.C.G.—P waves in lead II, shows no change but signs of R.V.H. have disappeared.

Case 8 (S.)—*Symptomatic relief*: Inspite of the shortness of the postoperative interval, this patient's capacity for exertion without dyspnoea has increased considerably. He can now walk at a fast pace but occasionally complains of slight palpitation.

Physical signs—The diastolic murmur is just audible at the mitral area with no thrill or presystolic accentuation.

Radiology—The most significant feature in the radiology is diminution of the aneurysmal bulge of the pulmonary artery at the pulmonary bay (Fig. 1A and 1B, *vide* Plate). There has also been lessening of the pulmonary congestion.

E.C.G.—The P waves in lead II have altered from a bifid broad type to unifid appearance. Evidence of right bundle branch block which was present before operation has disappeared. The evidences of right ventricular hypertrophy and strain have subsided.

Case 9 (A.B.)—This case has recently been operated on and it is too early to assess on the improvement. A remarkable feature however is the disappearance of the diastolic and systolic murmurs at the mitral area immediately after commissurotomy.

Case 10 (G.C.)—This case has been very recently operated on. The post-operative course uptil now has been uneventful.

CASE 11 (S.M.)—This case has also been recently operated on and assessment of symptomatic relief is not possible. This patient had both systolic and diastolic murmurs in the apical area before operation. No murmurs were audible immediately after operation.

DISCUSSION

SELECTION OF CASES FOR OPERATION :

Age—The optimum age for this operation is generally taken as between 20 and 40 years. It is well known that rheumatic activity usually burns itself out by the time the patient is 20 years of age and fresh recrudescence after this age is uncommon. It would ordinarily be unwise therefore to choose patients below the age of 20 years for operation, in case rheumatic recrudescence causes recurrence of stenosis of the mitral orifice. At the other end, patients above 45 years or so would be bad subjects for intracardiac manipulation. This kind of dual limitation can however only be relative—as the need for removal of the mechanical mitral obstruction can, in many cases (as in Case 2 and Case 8 in this series) be urgent and imperative inspite of the patient being in either a low or high age group. One patient who was 16 years of age had attacks of haemoptysis with frequent attacks of acute paroxysmal dyspnoea. He had no apparent rheumatic activity and his E. S. R. was low. Inspite of early age, operation was decided upon and at the operation the orifice was very tight. It was successfully split and the patient has had gratifying improvement since the operation. Another patient was 18 years of age but the operation was considered necessary in view of his marked disability.

Symptoms—Symptomatically the patients with mitral stenosis are divided into 4 categories :

(*i*) patients who are symptom-free but with physical signs of stenosis ;

(*ii*) patients with mild symptoms which are stationary ;

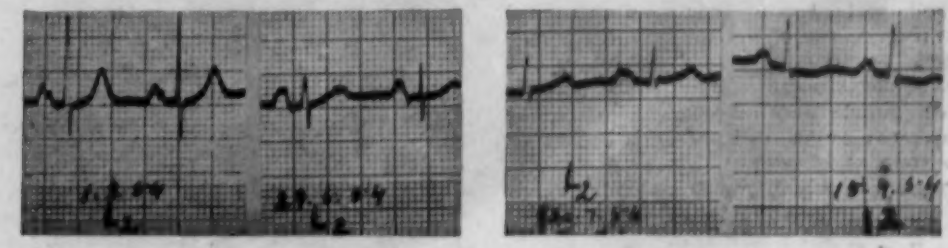
(*iii*) patients who symptomatically are rapidly deteriorating ;

(*iv*) patients who are in advanced degrees of cardiac failure.

Cases suitable for operation would be selected mostly from group 3. Milder cases would seldom agree to operation. Cases of group 4 would be bad operative risks. It would perhaps be pertinent to point out that many cases even of group 4 improve remarkably with efficient hospital care and medical management and would then be considered suitable for operation. This happened in at least 4 of our cases and all of them tolerated the operation well and could be carried through the post-operative period without undue anxiety.

Physical signs—Amidst the plethora of physical signs in mitral stenosis, the ones that are considered most reliable to select a good case with pliable cusps of mitral valve are, the presence of the diastolic thrill, the short and sharp 1st sound in the mitral area, the "opening snap" and the diastolic murmur with presystolic accentuation. Presence of significant mitral systolic murmur gives rise to presumption of mitral insufficiency and contraindicates commissurotomy. Absence of opening snap does not contraindicate the operation but the cusps in such a case are likely to be rigid. This was so in 2 cases where the cusps were calcified and in 3 others where the cusps were rigid.

Radiological signs—The important radiological signs that have been taken into consideration are : The straightening of the left border of the heart and the fullness at the region of the pulmonary bay —together constituting what is usually called the "mitralised" contour of the heart. In P.A. view, an additional finding in many cases was the double contour of the left atrium (Fig. 6A, *vide* Plate). Marked enlargement of the left atrium is not common in uncomplicated mitral stenosis, especially in the operable stage. What has been called 'aneurysmal' dilatation of the left auricle is usually obtained in mitral insufficiency either with or without associated mitral stenosis. An estimate of the dilatation of the left auricle may also be gauged from the impression on the Ba-filled oesophagus in R.A.O. position (Fig. 4, *vide* Plate). An un-



Case 2 Case 3 Case 4 Case 8

FIG. 7—E.C.G. LEAD II. BROAD P WAVES IN 4 CASES.

complicated mitral stenosis case should have little or no enlargement of the left ventricle. Overlapping of the vertebral border in the L.A.O. position of more than minimal degree should arouse strong suspicion of significant left ventricular enlargement and therefore of associated mitral or aortic insufficiency.

E.C.G.—A significant finding in most of the cases was the wide flat topped and often bifid 'P' wave—the so called mitral type of P wave (Fig. 7). Wood (1954) has placed considerable emphasis on the mitralised P waves in the selection of a case for commissurotomy and we took this into account in the selection of our cases. Evidence of right ventricular hypertrophy as judged in routine precordial leads was also significant and present in all the cases. Wood (1954) correlates electrocardiographic signs of R.V.H. with pulmonary vascular resistance. In this series, evidences of arteriosclerotic changes in the pulmonary vessels were seen on histological emamination of lingular biopsies. Evidence of left ventricular hypertrophy in the E.C.G. was present in only one case in this series and it should lead to a suspicion of complicating mitral insufficiency.

Cardiac catheterisation—According to most cardiologists routine cardiac catheterisation in cases of mitral stenosis is not necessary and except for one case, we have not done cardiac catheterisation in this series. In Case 2, the catheter could be passed into the left branch of the pulmonary artery and wedged into one of its terminal branches (Fig. 5, *vide* Plate) and both the pulmonary arterial pressure and the pulmonary capillary pressure which is usually taken as the pressure in the left auricle were extremely high.

Pre-operative cardiac catheterisation findings in this case were as follows:

Pressure in	S.V.C.	0 mm.	saline.
,,	,, R.A.	4 mm.	,,
,,	,, R.V.	560 mm.	,,
,,	,, P.A.	500 mm.	,,
,,	,, P.C.	310 mm.	,,

This high pressure was accounted for later in the advanced arteriosclerotic changes that were found in the pulmonary arterioles in the lingular biopsy and in the severe degree of stenosis.

Over-all results—It would be unprofitable to discuss about the over-all results of this small series of cases, who have not yet been followed up for a sufficiently long time, were it not for the fact that the comparatively low mortality even in this early period and the remarkable improvement in the general condition in some of the patients give us certain amount of satisfaction and encourage us to pursue this work further.

Mortality—The first case died. It appears now that this was not the best case that one could select for the initial effort as there was in this case a suspicion of certain amount of associated mitral insufficiency. Since then, good results in ten consecutive cases point to the comparatively reasonable safety of the operation.

Post-operative improvement—Although there has been significant changes in some of the physical signs as also in the skiagraphic (Fig. 6A and 6B, *vide* Plate) and electrocardiographic evidences (Fig. 8), it is in the freedom from incapacitating symptoms such as paroxysmal or exertional dyspnoea, in the improvement of the general health, and in ability to do ordinary everyday activities that the ultimate success of the operation will be judged. We have carefully analysed all the post-operative data and we can classify our results, as at present, in the following categories:

(1) *Significant improvement*—5 cases.

(*a*) Freedom from dyspnoea on running a distance of 30 yards.

(*b*) Weight gain of more than 10 lbs.

(*c*) Improvement on radiological and electrocardiographic examinations.

(2) *Moderate improvement*—Improvement of the capacity for exertion as compared to pre-operative state with no improvement in X-ray or E.C.G.—1 case.

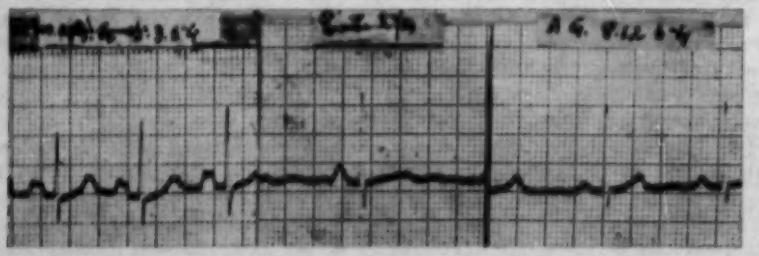


FIG. 8—SHOWS CHANGE IN THE P WAVES IN LEAD II AFTER OPERATION FROM BIFID TO UBIFID TYPE WITH REDUCTION OF HEIGHT AND WIDTH.

(3) *Slight improvement*—Slight improvement in the capacity for exertion as compared to pre-operative state but with occasional attacks of paroxysmal dyspnoea—1 case.

It is not yet possible to evaluate the last 3 cases.

Summary

(1) The preoperative and the operative findings and the results of operations of 11 cases of mitral stenosis who underwent commissurotomy are presented.

(2) Comments are made on the criteria for the selection of a suitable type of case.

(3) The operative procedure and important steps in the postoperative care of the patients are briefly described.

(4) The over-all results of 11 consecutive cases who survived are discussed in some detail.

Acknowledgment

We wish to express our thanks to Dr. A. K. Duttagupta, Superintendent, Nilratan Sircar Medical College, for allowing us to use the case records for this paper.

Much of the success in this series of cases was due to the capable way in which our anaesthesiologist, Dr. S. Chatterjee, not only administered anaesthesia at the time of the operation but also looked after the cases in the post-operative period. His energy and enthusiasm has been stimulating. We must also express our indebtedness to the house men of the thoracic surgical unit particularly to Dr. Asraf who have been alert and tireless in looking after the cases in their charge.

Two cases of this series were initially under Prof. N. R. Konar, and one case was referred to us by Dr. A. B. Mukherjee. They have taken keen and active interest in their cases and have co-operated with us in the follow-up studies. We also wish to thank Prof. S. N. De for the histological reports, Prof. S. Bose for radiological examinations, and Dr. D. P. Basu for electrocardiographic help.

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AN EXPERIMENTAL STUDY OF THE COMPARATIVE ACTIVITY OF INDIGENOUS DIURETICS

M. L. GUJRAL, M.B., M.R.C.P.,

P. N. SAXENA, M.D. (MED.), M.D. (PHARM.)

AND

S. S. MISHRA, M.B.B.S.,

Department of Pharmacology, Lucknow University

A large number of indigenous drugs have been claimed to have a diuretic effect in the Ayurvedic system of medicine. Some of these drugs are used in galenical preparations in the scientific system of medicine as well. As yet there has been no systemic quantitative study done on indigenous diuretics. In this study thirty three indigenous drugs selected from Ayurvedic literature and said to be diuretic have been tested. The relative diuretic potency of these drugs has been estimated and compared with a standard which is urea (0·75 g./kg.) in this study. For obtaining a comparative idea as to the relative diuretic potency, potassium acetate and two mercury compounds have also been tested by the same method. The method adopted is that evolved by Lipschitz, Hadidian and Kerpesar (1943) which is a modification of the method described by Burn (1950) for assaying antidiuretic substances. This method is simple, accurate and applicable to a variety of substances. The relative diuretic potency has been determined by the formula T/U, evolved by van Armar (1954). Further calculations were not carried out as the content and nature of the active diuretic principle or principles in the decoction of the drugs were not known. It may also be mentioned here that there may be species variation of diuretic activity, and results (Charak and Bhava Mishra) of this nature cannot be wholly translated in human case.

The drugs tested are listed in Table 1.

Table 1—List of Drugs Tested

Vernacular name	Botanical name	Parts used
Banafsha ...	*Viola odorata*	Flowers
Piya bansa ...	*Barleria prionitis*	Leaves
Talmakhana ...	*Hydrophila spinosa*	Seeds
Bekahu ...	*Saccharum officinale*	Root
Jatamansi ...	*Nardostachys jatamansi*	Root
Hauber ...	*Thevetia nerifolia*	Fruit
Varun ...	*Crataeva religiosa*	Bark
Shyonak ...	*Oroxylum indicum*	Bark
Tarbuz ...	*Citrullus vulgaris*	Seeds
Bansh ...	*Bambusa orientalis*	Leaves

Vernacular name		Botanical name	Parts used
Kakri	...	*Cucumus sativus*	Seeds
Gokhru	...	*Tribulus terrestris*	Fruit
Anantmool	...	*Hemedesmus indicus*	Root
Kulfa	...	*Portulaca oleracea*	Seeds
Punarnava	...	*Boerhaevia diffusa*	Twigs
Sarpat	...	*Saccharum arundinaceum*	Root
Dhaan	...	*Oryza sativa*	Root
Kahu	...	*Lactuca sativa*	Seeds
Agastya	...	*Agati grandiflora*	Twigs
Apamarga	...	*Achyranthes aspera*	Twigs
Devdarn	...	*Pinus deodara*	Bark
Mulethi	...	*Glycyrrhiza glabra*	Stem
Kokabeli	...	*Nymphae alba*	Flowers
Kababchini	...	*Cubeba officinalis*	Fruit
Kamal	...	*Nelumbium speciosum*	Flowers
Mooli	...	*Raphanus sativus*	Root
Kush	...	*Andropogon nardaiydes*	Root
Pashanbhed	...	*Saxifraga ligulata*	Stem
Banda	...	*Vitex agnus castus*	Twigs
Okatkambal	...	*Peterospermum aserifolium*	Twigs
Shatavari	...	*Asparagus racemosus*	Root
Narkul	...	*Arundo karka*	Root
Gundra	...	*Saccharum ciliare*	Root

Mersalylum
Chlormerodrin (N.N.R.)
Potassium acetate

Methods and Material

Preparation of the drugs—The individual drug was finely pulverised. Twenty-five grams of this powder was added to 200 c.c. of distilled water and boiled till the volume was reduced to one quarter of the original. The decoction was filtered through thick cloth.

Solution of urea was prepared by dissolving 0·75 g. in 25 c.c. distilled water, of chlormerodrin by dissolving 5·5 mg. in 25 c.c. of distilled water and of potasium acetate by dissolving 1·55 g. in 25 c.c. of distilled water.

Animals employed—Healthy white rats of either sex weighing between 140 g. and 240 g. were employed. They were not given any food and water for the preceding 12 hours and were divided into five groups, each of four, so that the total weight of each group was approximately the same.

Feeding the drug—Of the five groups, one group served as a control and was fed normal saline into the stomach through a stomach cannula fitted to a 10 c.c. syringe. Two groups were fed solution of urea and the remaining two groups were similarly fed the decoction of drug. Each of these preparations was given in dose of 2·5 c.c./100 g., so that the fluid intake was the same in all cases. Mersalylum was injected intraperitoneally in dose of 0·5 mg./100 g. Fluid intake was made up by oral administration of normal saline as above.

Collection of urine—After feeding, the animals were placed in special metabolic cages and remained there without food or water for the duration of the experiment. At the end of five hours, the animals were taken out of the cages and the total volume of urine excreted by each group was noted. Since in the process of feeding, the animals lose all their urine, it was considered important at the end of the experiment to expel the urine from the bladder by pulling at the base of the tail.

Results

The volume of urine excreted during five hours in each group has been expressed as per cent of the liquid administered. This percentage gives a measure of *urinary excretion* independent of the group weight, thus

$$\text{Urinary excretion} = \frac{\text{Total urinary output}}{\text{Total liquid administered}} \times 100$$

The ratio, urinary excretion in test group : urinary excretion in control group has been used as a measure of the *diuretic action* for the given dose of the drug.

$$\text{Diuretic action} = \frac{\text{Urinary excretion in test group}}{\text{Urinary excretion in control group}}$$

In practice, however, it has been found necessary for obtaining the *diuretic activity*, to compare test groups receiving the drug with parallel test groups receiving the standard, that is, urea. This reduces the variability materially.

$$\text{Diuretic activity} = \frac{\text{Diuretic action of drug}}{\text{Diuretic action of urea}}$$

$$= \frac{\text{Urinary excretion in test with drug}}{\text{Urinary excretion in control}} \times \frac{\text{Urinary excretion in control}}{\text{Urinary excretion in test with urea}}$$

$$= \frac{\text{Urinary excretion in test with drug}}{\text{Urinary excretion in test with urea}} = \frac{T}{U}$$

Since the same control group appears in the estimation of relative activity only as a constant term which in the above equation cancels out, it is simpler to use the percentage of urinary excretion for such estimates. The control then serves as a check on experimental conditions, but does not enter the calculation of the relative potency. The results of the experiments are summarised in Table 2 and arbitrarily assessed as good, moderate, slight and nil.

TABLE 2—SHOWING SUMMARY OF RESULTS EXPRESSED AS T/U

Vernacular name	Diuretic T/U	Degree of activity
Eekshu	2·51	Good
Potassium acetate	2·18	"
Jatamansi	1·86	"
Shyonak	1·60	"
Banafsha	1·53	"
Piya bansa	1·47	Moderate
Talmakhana	1·45	"
Hauber	1·37	"
Varun	1·36	"
Tarbuz	1·27	"
Kakri	1·26	"
Bansh	1·20	"
Gokhru	1·19	"
Anantmool	1·18	"
Kulfa	1·16	"
Punarnava	1·14	"
Sarpat	1·10	"
Kahu	1·09	"
Dhaan	1·00	"
Kokabeli	0·99	Slight
Mulethi	0·94	"
Agastya	0·94	"
Devdaru	0·85	"
Mersalylum at 5 hrs. ...	0·83	"
Kush	0·81	"
Apamarga	0·80	"
Kababchini	0·77	"
Narkul	0·76	"
Kamal	0·75	"
Mooli	0·71	Nil
Pashanbhed	0·68	"
Banda	0·58	"
Shatavari	0·58	"
Olatkambal	0·51	"
Gundra	0·14	"
Chlormerodrin at 5 hrs. ...	0·21	"
at 12 hrs. ...	2·47	

DISCUSSION

The mean diuretic action of urea in 20 groups (each group of four rats) is found to be 2·432 with a standard deviation of 0·239. A value less than 0·72 has been supposed to represent no activity.

Group I contains the drugs showing good diuretic activity above 1·5. According to order of activity these are eekshu, jatamansi, shyonak and banafsha. Potassium acetate is less potent than eekshu but more potent than the other three drugs. Mersalylum and chlormerodrin have no or slight activity at 5 hours interval; the activity of chlormerodrin at the end of 12 hours equals that of 5 hours period activity of eekshu. As the mercurials take more than 12 hours to exhibit their diuretic activity and our experiments were not continued upto this period, this comparison with mercurials is not tenable. Similar explanation may hold good in cases of other drugs tested and showing lesser or no activity.

Group II contains drugs showing moderate diuretic activity ranging between 1·0 and 1·5. It contains piyabansa, talmakhana, hauber, varun, tarbuz, kakri, bansh, gokhru, anantmool, kulfa, punarnava, sarpat, kahu and dhaan. All of these are more potent as diuretic than urea but less potent than potassium acetate.

Group III—This group includes drugs like kokabeli, mulethi, agastya, devdaru, kush, apamarga, kababchini, narkul and kamal which show only slight diuretic activity.

Group IV—This group includes drugs showing no definite diuretic activity with reference to urea. The drugs in this group are mooli, pashanbhed, banda, shatavari, olatkambal and gundra. However, the urinary output was greater in all instances when compared with the control group.

SUMMARY

1. Thirty three indigenous drugs said to be potent diuretics in the Ayurvedic system of medicine have been screened experimentally on rats. The preparations of these drugs used are decoctions as recommended by Ayurvedic practitioners.

2. The diuretic activity has been determined with reference to urea as standard in terms of T/U value after van Armar. Potassium acetate, mersalylum and chlormerodrin have been evaluated by the same method for obtaining a comparative idea.

3. The diuretic activity could not be evaluated in terms of log dose—log action curves as no actual doses or the nature of the active principle or principles were known.

4. The mean diuretic action of urea in 20 groups (each group of 4 rats) was found to be 2·432 with a S.D. of 0·239.

5. Four drugs, namely, eekshu, jatamanshi, shyonak and banafsha compare favourably with potassium acetate and are much more potent than urea. Punarnava and gokhru which are widely recommended and used as diuretics are shown in this study to be less active than the drugs mentioned in Group I.

6. Drugs of the second group compare favourably with urea, while drugs of 3rd and 4th groups show a lesser diuretic activity than that of this drug.

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CARDIOVASCULAR TOXICITY OF QUININE AND QUININE CALCIUM GLUCONO-GALACTOGLUCONATE IN EXPERIMENTAL ANIMALS

M. N. JINDAL, M.D.,

New Delhi.

The depressant effect of quinine on the cardiovascular system has long been known and has been a great handicap when administering quinine by the parenteral route. In certain forms of pernicious malaria quinine sometimes has to be administered by the intramuscular or intravenous route when the cardiovascular toxicity of quinine becomes a great danger. Calcium, in small doses, is well-known to be a cardiovascular stimulant. It was therefore thought that if some salt of quinine was administered along with calcium, by the parenteral route, the depressant effect of the former might be counteracted and the drug rendered safer. One such preparation is available containing quinine gluconate and calcium gluconogalactogluconate (quinine calcium compound). In the following experiments, described below, a comparative study has been made between the pharmacological properties of quinine bihydrochloride and quinine calcium compound on the cardiovascular system of dogs.

Studies on Blood Pressure

Experiment—The animals used in these experiments were dogs weighing, on an average, 2-4 kg. The anaesthesia used was ether and 2 per cent barbitone. The latter was given as the maintenance anaesthesia administered through the cannulated femoral vein. A kymographic record of the carotid blood pressure was made and the effects were noted after the administration of the graded doses of the drugs through the cannulated femoral vein.

Results—Graded doses of quinine bihydrochloride and quinine calcium compound ranging from 5 to 40 mg. were given. A fall in the blood pressure was noted with all the doses administered though it was not quantitatively strictly proportionate (Fig. 1—A and B).

Table 1—Showing a Comparative Average Fall in Blood Pressure

No. of experiments	Dosage in mg.	Average fall in B.P. in mm. of Hg.	
		Quinine	Quinine calcium compound
6	5	31	18·5
5	10	42	33·4
4	20	55	38
4	40	45·5	35

Studies on Myocardium

Dogs of an average weight of 2 to 4 kg. were used, anaesthetised with ether and barbitone. The trachea was exposed in the neck and cannulated. It was then connected to the artificial respiration pump. The chest was cut open in the midline and the heart exposed. The pericardium was cut open and separate contractions of the auricle and ventricle were recorded on the moving kymograph. Graded doses of the drugs were administered and the effects recorded (Fig. 2—A and B).

(A) (B)

Fig. 1—Showing the Fall in B.P. with (*a*) 5 mg., (*b*) 10 mg. and (*c*) 20 mg. of (A) Quinine and (B) Quinine Calcium Compound.

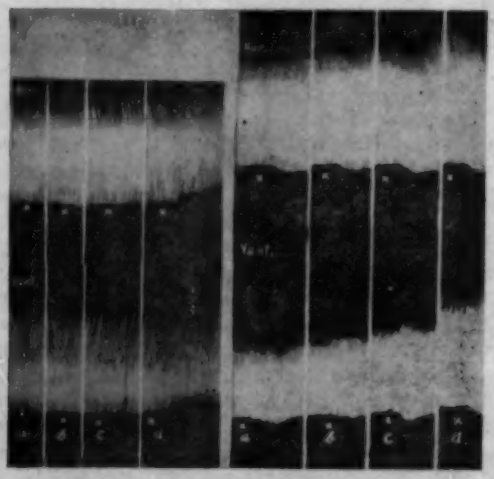

Fig. 2—Showing the Effect on the Intact Heart of Dogs with (*a*) 5 mg., (*b*) 10 mg., (*c*) 20 mg. and (*d*) 40 mg. of (A) Quinine and (B) Quinine Calcium Compound.

Results—Graded doses of quinine and quinine calcium compound ranging from 5 to 40 mg. were given. Small doses of quinine, such as 5, 10, 20, mg. did not show any appreciable effect on the rate or the force of contraction of the auricle and the ventricle. On administration of 40 mg. of quinine, a marked depressant effect on the auricular and ventricular contractions was noted. On the other hand, quinine calcium compound exhibited a stimulant effect in all the doses administered.

Effect on the perfused vessels and the carotid sinus of dogs was also investigated. The results obtained with both the drugs were similar.

Discussion

In the present study on the arterial blood pressure of dogs, a fall in the blood pressure with both the drugs was noted. On comparing the approximate equihypotensive doses of these drugs, it was found that 5 mg. of quinine produced the same degree of fall in blood pressure as 20 mg. of quinine calcium compound. On the myocardium of dogs, quinine in small doses did not produce any appreciable change but larger doses such as 40 mg. produced a marked depression of the myocardium. Both the force as well as the rate of contraction was reduced. On the other hand, quinine calcium compound caused stimulation of the myocardium from the very beginning. The present experiments of quinine bihydrochloride on the myocardium coincides well with those reported by Hammet-Raymond (1927) who observed diminished tonus, excitability and force and a prolonged refractory period with the intact or perfused or atropinised heart. The effect of quinine, in combination with calcium, had not then been investigated. The present experimental study revealed the beneficial effect of calcium, besides rendering quinine a safe drug for parenteral administration. Further clinical studies, to establish the results obtained in animal experiments, are in progress.

Summary

(1) A comparative study of quinine and quinine calcium compound on the cardiovascular system of dog has been made.

(2) Quinine calcium compound has been found to be much less toxic on the blood pressure of dogs.

(3) Quinine has been found to be depressant to the myocardium of the intact heart of dog while quinine calcium compound in big doses was found to be a stimulant.

(4) Thus quinine calcium compound is considered a safe drug for parenteral administration.

Acknowledgment

The author is indebted to Dr. M. D. Chakravarti, Director, Central Drugs Laboratory, Calcutta, under whose inspired guidance the work was conducted.

The author is also grateful to Messrs. Sandoz Products Ltd., for a liberal supply of Calgluquine (quinine calcium gluconogalactogluconate) for these experiments.

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REFRESHER COURSE

INFANTILE DIARRHOEA

P. N. LAHA, M.D. (PAT.), M.R.C.P. (LOND. & EDIN.), D.C.H. (ENG.),

Professor of Medicine,

G. R. Medical College, Gwalior, M. B.

The symptom of diarrhoea assumes major importance during infancy. An infant is very much prone to develop diarrhoea because (1) an infant's stomach possesses less sterilising power owing to the little secretion of hydrochloric acid, (2) milk, which is the staple food of an infant, is anything but a bacteria-free fluid, and (3) an infant is particularly liable to develop diarrhoea as a complication of infections elsewhere.

Aetiology

It has the greatest incidence during the first year of life, and the mortality is relatively higher than at any other age. Breast-feeding diminishes the incidence of diarrhoea. Except when there are specific reasons or contraindications, breast-feeding must be encouraged and emphasised. When an infant is fed by bottle, due precautions must be taken for proper sterilisation of the bottle and the teats. It is more common in summer. There appears to be a relation not only to the environmental temperature, but also to the humidity, the incidence being highest during periods of high humidity and high environmental temperature or immediately after such periods. It is probable that climatic factors not only favour the growth of bacteria in food, but also affect adversely the resistance of infants. In summer, the secretion of hydrochloric acid in the stomach becomes very much less, and thereby the sterilising power of the stomach becomes poorer.

Pathology

Correlation between the anatomical findings of the intestinal tract and the severity of symptomatology is difficult. The following changes may be present, e.g., generalised increase in the vascularisation, slight thickening or at times denudation of the mucous membrane, congestion of Peyer's patches, distension of the stomach and intestines, and occasionally extensive evidences of inflammation, with or without localised ulceration. Microscopically, there is usually some degeneration of the mucosal cells, which may be completely destroyed in areas, and there is usually perivascular round cell infiltration. The kidneys, liver, heart and brain may show degenerative changes.

Biochemical Changes

The water and electrolyte balance is disturbed in acute diarrhoea. This is aggravated by the fact that infants readily lose body water and develop disturbances of acid-base equilibrium. There is dehydration of the tissues with consequent loss in renal function. Due to loss of electrolytes principally through the intestines, there is more loss of base than acid salts, resulting in acidosis. Due to impaired renal function acidosis is accentuated owing to the retention of acid metabolites which are otherwise excreted in the urine. If diarrhoea is associated with vomiting the loss of hydrochloric acid in the gastric contents may be sufficient to counterbalance the loss of base in diarrhoeic stools, so that there is disturbance of the acid-base equilibrium and only a marked reduction in both anions and kations. Rarely there may result alkalosis instead of acidosis, if vomiting is prominent and consequent loss of more anions than kations.

Diarrhoea may be divided into three main groups: (1) dietetic, (2) infective and (3) parenteral diarrhoea.

Dietetic diarrhoea—The main cause is unsuitable food. The parents may give an excessive amount of food per day with the consequence that the digestive capacity becomes overtaxed and breaks down sooner or later. An excess of fat (e.g., by feeding with buffalo's milk, which has a high fat content) may produce fatty diarrhoea with the passage of free fatty acids in the stools, and they may become loose, curdled and sour-smelling. Excess of carbohydrate, usually in the form of starch, may lead to carbohydrate diarrhoea, particularly when the starch is introduced at too early an age, before the sixth month. The stools become loose, frothy and green, indicating an excessive fermentation going on in the intestine.

Infective diarrhoea—This is due to an infection of the gastro-intestinal tract, streptococci, *B. proteus, B. enteridis sporogenes, B. lactis aerogenes, B. paratyphosus* and dysentery bacilli.

Parenteral diarrhoea—This term is used for those cases in which the diarrhoea is secondary to some condition outside the gastro-intestinal tract. Any acute infection in an infant is liable to give rise to diarrhoea. The severity of the infection does not necessarily change the threshold to precipitate the diarrhoea. In some cases a small stitch abscess in a circumscribed wound while in others a severe meningococcal infection will cause parenteral diarrhoea. It is often a sharp illness, and unless the possibility of infection in some other part of the body is always borne in mind, it is very easy to overlook the secondary nature of the diarrhoea.

Character of the motions—When the stools are green, it is popularly known as "green diarrhoea". In the majority of instances it is merely due to the bile pigment being hurried on through the intestines without having undergone the usual changes.

Stinking and putrid stools are due to hurried peristalsis, a mass of imperfectly digested and incompletely absorbed food lodges in the colon, causing putrefaction.

Lumpy or cheesy stools consist of white particles, varying in size, more or less oval or rounded in shape, scattered all through the faecal matter. These round or oval particles are in some cases the remains of undigested milk; they consist partly of casein and partly of a soapy substance formed from the fat of milk and lime salts, and indicate that the child is getting more milk than he can digest, but in many cases they consist simply of little balls of altered mucus, showing a catarrh of the bowel.

Irritating stools scald the skin. An erythematous eruption over the buttocks, develops due to the presence of fatty acids—butyric acid and its allies—and means that there is too much of fat in the diet. This can be the result of feeding with buffalo's milk.

Frothy acid stools are due to excess of sugar in the diet.

'Slimy' stools result when the stools contain mucus in excessive quantity. In this connection, it must be remembered that barley-water may produce slimy looking stools, which look very like the one which contains mucus.

Clinical Picture

The onset may be acute, or there may be a gradual increase in the number of stools, which varies widely from six to sixty. The character of the stools may be of any type as described above. The temperature may be raised depending upon the cause. In mild cases there may be no fever, while in severe cases of infective and parenteral diarrhoeas, the temperature may be very high. Sooner or later dehydration supervenes if diarrhoea is not controlled; the infant becomes pale and restless, the anterior fontanelle loses its normal resilience and pulsation and becomes depressed, the eyes look sunken, and the skin loses its elasticity, so that when it is pinched it remains wrinkled instead of springing back to its former position. The tongue becomes furred and red, the abdomen becomes scaphoid except when there is tympanites, and the peristaltic movements of the small intestine may be visible. Abdominal tenderness is seldom present, except in the case of pneumococcal peritonitis, where one of the most characteristic symptoms is diarrhoea, occurring in about 90 per cent of cases, and usually continuing for some days. This is a particularly noteworthy feature since in other forms of peritonitis constipation is the rule. The pulse becomes rapid, and the heart sounds are soft and may assume the tic-tac character. If dehydration persists, oliguria gradually develops; in severe cases it may result in complete anuria. Later the symptoms of toxaemia may be added. Then the face looks livid and pinched, restlessness gives place to apathy, the eyes stare and respirations become shallow.

In the extremely severe cases, the tempo is very fast. The onset is like an avalanche, with violent purging, staring eyes, sighing respirations, rapid irregular pulse with a quick supervention of hyperpyrexia, ending fatally.

When diarrhoea is associated with fever, difficulty may arise as regards the type, whether infective or parenteral. In infective diarrhoea the stools usually contain blood and mucus, whereas in parenteral diarrhoea blood and mucus are absent.

It must be remembered that at times underfeeding may manifest as diarrhoea by the passage of a few green stools a day—the so-called "hunger-stools".

It must further be remembered that some infants evacuate as soon as they are fed, and the mother gets alarmed that her infant is suffering from diarrhoea. In such cases if the infant thrives well with increase of weight notwithstanding the evacuation after every feed, the mother should be reassured that there is nothing wrong with the infant. The evacuation is only an expression of non-development of control over the gut, which will come gradually.

Diarrhoea is sometimes a symptom of rickets. In such cases rickets is not very marked but they have a constant tendency to develop diarrhoea which is due to gastro-intestinal catarrh. In them the rickety element is apt to be overlooked.

Teething is another condition when diarrhoea may be a symptom. This is due to an increased liability to catarrh of the alimentary tract. Such catarrh is usually mild and respond quickly to simple measures, but the diarrhoea is likely to recur with each successive tooth.

Complications

Otitis media, apart from being a cause of diarrhoea, may also develop as a complication. Skin complications, e.g., small abscesses in the subcutaneous tissues, purpura, and sclerema—a patch of subcutaneous fat feeling as though solidified—may occur. Thrush may be another complication. Thrombosis of veins is an occasional complication, the large veins or the cerebral sinuses being affected.

Prognosis

Prognosis depends upon various factors. The smaller the infant the worse is the prognosis. The severity of dehydration plays a significant role in determining the prognosis. It also depends upon the total number of stools passed during 24 hours. The prognosis of infective and parenteral diarrhoeas is worse than that in dietetic diarrhoea. The type of infection and the sensitivity of the bacteria to chemotherapeutic and antibiotic drugs are very important factors in relation to the prognosis. Skin complications are generally of bad prognosis. Thrombosis of cerebral sinuses is also a very dangerous complication. The earlier the treatment is started the better is the outlook.

Treatment

There are three main principles which underlie the treatment of infantile diarrhoea. They are: (1) to rid the bowel of the irritant food or toxic matter, (2) to combat the dehydration, and (3) to rest the intestines for at least a day or two before making a gradual return to a suitable diet.

At the beginning of dietetic and infective diarrhoeas, an initial purgative for emptying the bowel to get rid of the irritant is a wise step. For that, half a teaspoonful of castor oil for every six months of age will suffice.

Washing out the colon as a means of elimination may also be tried. Warm saline is good for this purpose. The washing should be done carefully, and the can must not be raised more than 2 feet.

Every attempt must be made to combat the dehydration, because an infant cannot stand dehydration long. This can be attempted by giving repeated sips of sterile water, glucose water (5 per cent), albumen water, or half-strength Hartmann's solution (an isotonic solution containing sodium lactate, sodium chloride, potassium chloride, and calcium chloride) reckoning to get in an ounce or more every hour. Repeated vomiting contraindicates oral sips. But hydration per oral route must be started as soon as possible. If there is too much fermentation, dextrimaltose may be given instead of glucose. When the dehydration is marked the subcutaneous injection of normal saline to which 2½ per cent of glucose water has been added is the most convenient method. The injection can be made into the loose tissues below the axillae or the lateral aspects of the thighs. Some prefer to give it in the subcutaneous tissues of the abdomen. Three to six ounces can be run in slowly on each side. The amount to be given will depend upon the size of the infant and the speed with which the saline is absorbed. It can be repeated once or twice a day until the infant is able to retain fluid by mouth.

When dehydration is very marked, saline should be injected intravenously. The continuous drip method is the most satisfactory. The solution to be infused is half-normal saline, to which 5 per cent glucose should be added. In infants not more than a 5 per cent glucose solution should be used, since more concentrated ones lead to forced diuresis and dehydration. In older children 10 per cent glucose may be used. Half-strength Hartmann's solution may also be employed with good effect. The infusion should be continued until dehydration has been corrected, the diarrhoea has eased off, and weak feeds by mouth are being taken satisfactorily. Large amounts of fluid may be given within a period of twentyfour hours if excessively rapid rates of administration are not used and if the intake of salt is kept low. When a continuous intravenous clysis is used, 60 to 80 c.c. per hour is probably the upper limit of safety in infants. In older children, up to 300 c.c. per hour may be given. An excessive rate over a short period of time is much more dangerous than a large twentyfour hour volume. Infants and children with pneumonia, cardiac conditions and nephritis often tolerate intravenous fluid therapy poorly and should be given fluids by this route with great caution. This also applies to some patients with disturbances of the central nervous system who develop oedema of the lungs. A summary of the daily intake is essential for any plan of continuous parenteral fluid therapy. Unless close account is kept of amounts administered, cumulative small errors may assume formidable proportions.

Infusions into the peritoneum and the bone marrow have proved possible, but they are beset with risks and, hence, are better avoided.

At times the response to saline transfusions for dehydration is sluggish, for the reason that intracellular as well as extracellular fluid has been lost, with a consequent loss of intracellular potassium. A small addition of potassium to the intravenous drip, such as 1 g. of potassium chloride over a twentyfour-hour period, may then be required. Such cases of resistant dehydration should be distinguished from those in which the dehydration rapidly returns as soon as intravenous therapy is discontinued; the latter is particularly likely to happen in parenteral diarrhoea when a local focus of infection such as otitis media or mastoiditis has been overlooked.

The transfusion of a small amount of whole citrated blood may have to be given at times when an infant is judged to be too ill to recover with saline injections. A preliminary red-cell count should be made, for if the degree of dehydration has been severe the red cells may be so concentrated that the count is well above normal, and in that case serum would be more valuable than whole blood.

Drugs—Bismuth carbonate in large doses is the drug of choice. It should never be given in less than 5-grain doses. The author has been giving it in as large doses as 20 grains three times daily for infants with very encouraging results. It can be usefully combined with aromatic chalk powder, 5 grains three times daily. The mixture may be sweetened with glycerine. When bismuth is given in large doses, some amount of it may come out with the stools. The parents must be told about it, otherwise they may be unnecessarily alarmed.

For infective diarrhoea, sulpha drugs have to be given. They are sulphaguanidine, succinylsulphathiazole and phthalylsulphathiazole. Sulphaguanidine has been used extensively, but owing to its absorption from the gut in appreciable amounts and the danger of toxic reactions it has largely been superseded by the other two compounds, which are also more active against both coliform and dysentery organisms. Succinylsulphathiazole and phthalylsulphathiazole are least

absorbed from the gut, and the action is entirely local. The author prefers the latter compound. Its dose need not exceed 0·04 g. per kilogram body weight or 0·02 g. when the diarrhoea has ceased.

The results obtained with streptomycin administered orally in the treatment of infantile diarrhoea have been impressing. Although the cause of epidemic infantile diarrhoea remains uncertain there appears to be a close association between this disease and certain types of *E. coli* infection. Results with oral streptomycin in these cases have been highly satisfactory. But the use of streptomycin alone may be attended with the risk of the production of resistant strains. Streptomycin rapidly loses its effect from the survival of drug resistant organisms, which are present in every strain. This may be counteracted by combining the streptomycin with another agent to which the organism is sensitive. When streptomycin is combined with a sulphonamide for the treatment of infections of the gastro-intestinal tract, the development of resistant strains is inhibited.

Opium is undoubtedly a most valuable drug in dealing with infantile diarrhoea, but its mention has been delayed until now because its use entails a careful selection of cases, and the effect of the drug must be closely watched. When the diarrhoea is severe in proportion to the vomiting, when the stools are green and tend to be offensive, and in cases of ileocolitis opium may be used. It is contraindicated when the tongue has become very dry and when the symptoms of toxaemia—apathy, shallow respirations, rapid irregular heart action—have replaced those of dehydration. In infants it should be used with extreme caution. Pulv. ipecac co., 1/8 grain for every three months of age, is a useful preparation which may be combined with bismuth carbonate. A liquid preparation is more often taken readily, in which case tinct. opii (m. ½ for every three months of age up to a year) may be prescribed. It must be remembered that in order to prevent the chance of overdosage with opium, those in charge should never wake the infant for the medicine, and to omit it if he is drowsy.

When there are signs of collapse, stimulant treatment (e.g., a warm bath, or better still a mustard bath), brandy, nikethamide, etc. will help to rally the infant.

When the collapse is such as needs urgent stimulation, a hypodermic injection of strychnine may temporarily tide the infant over. A suitable dose would be m. ½ of liquor strychninae B.P. up to three months age, and m. ¼ up to twelve months. In addition, the infant must be kept warm.

CHRONIC ENTEROCOLITIS

BIDHUBHUSAN BHATTACHARYA, M.D. (CAL.),

Director—Medicine,

Seth Sukhlal Karnani Memorial Hospital, Calcutta.

A very common ailment in our country is gaseous distension of the abdomen, often attended with alternate constipation and diarrhoea. Such a symptom is usually regarded as a manifestation of carbohydrate indigestion and the sufferers have recourse to various measures, e.g., cutting down their diet to a low level, changing the dietary, choosing drugs for themselves from advertisements in the lay press. Thereby they sometimes may get relief but recurrences follow and ultimately they feel they have got some serious disease and become bowel-minded psychological patients.

History-taking from such patients almost invariably brings out some sort of dysenteric attacks earlier, may be several years back, and often attacks of acidity, heartburn and commonly loose stools with mucus for a few days following a bout of constipation. Over-cautious patients often lose weight, mostly due to low diet through fear of abdominal distress and acidity. The common complaints are indigestion, loss of appetite, sense of fullness in upper abdomen particularly after taking food, irrespective of the character of food. Regular distension of the abdomen due to gas accumulation continuing for several hours, giving rise to a sense of tightness (even ordinary clothes become distressing round the waist) occur after food and probably a sense of relief and hunger comes by the next meal-time. This meal again produces repetition of the same events. Persons who can ignore the distress and take their regular meals in spite of it, acidity and loose motions, usually do not lose much of their weight, and generally carry on with their usual avocations but complain of various troubles off and on.

Another group of patients cannot take their food properly and believe in restricted diet, sometimes to a starvation level, and lose weight quickly and very often feel exhausted, asthenic and debilitated. These persons require immediate assurance and suitable high caloric diet in addition to medical treatment to correct their indigestion and chronic colonic trouble.

A third group of such sufferers falls a prey to other more serious diseases. Such patients, besides the usual digestive troubles often suffer from a low grade fever—sometimes unknowingly—and gradual emaciation and asthenia.

On physical examination of most of these patients very little can be made out except a little gurgling sensation in the right iliac fossa, sometimes tenderness here and there and gaseous distension along the whole of the colon.

Examination of stools often reveals mucus, which may be at times absent, and microscopic examination report shows presence of starch or undigested vegetable and muscle fibres and cysts of *Entamoeba hystolytica* and/or *Giardia lambia*.

The management of such conditions is often troublesome as the patients with their recurrent troubles have already tried many of the anti-amoebic drugs and have cut down from the dietary most of the common foods while they can easily afford and will not be easily persuaded to take a more liberal diet. But one thing is certain—if a person cannot be forced to take sufficient amount of food his physique cannot be regained—the available food must be given with the proper help for digestion and assimilation. Even if the number of stools increases with additional food, and if there be no other distressing symptom or any definite contraindication, the patient should be encouraged to take it. In such conditions a small dose of sedative (phenobarbitone gr. 1) and osmokaolin with digestive drugs are helpful. Care must be taken in the diagnosis that they are not really suffering from a serious disease, e.g., pulmonary tuberculosis, which is often missed as there is no real record of the temperature chart.

It is often found that fever associated with bowel troubles is passed as due to *E. coli* infection or due to intestinal irritation or some such ailment. Unless the lungs are carefully examined, physical signs of pulmonary tuberculosis, although present in an exudative form, i.e., without moist sounds in the lungs in the limited apical regions, are overlooked. Therefore, symptoms of fever in the form of burning sensation all over the body or marked asthenia with distaste for food in any form, particularly in the evening, and presence of slight cough during that period should always put one on guard. Skiagraphy of the lungs should be advised whenever loss of weight and asthenia, long continued intestinal trouble with febrile disorder, discoloration of the skin specially of the face and any other suspicious sign present themselves during diagnosis. The importance of this point cannot be overemphasised.

Another group with similar symptoms but with no complaint about the lungs is found in chronic dysenteries of bacillary origin, of giardiasis and certain salmonella affections.

Besides the specific form of treatment, whenever possible every care must be taken to improve the digestion with improved diet. A high protein diet may be prescribed but very few can afford it. On the other hand, the common practice of dieting with sugar, glucose, barley water or a little soup must be deprecated. Sugar in any form always aggravates such condition. Glucose may be given when necessary parenterally, but in no case orally. Rather it is more advantageous to encourage the patients to take whatever food is available in their family and to assure them that nothing worse will happen by taking a full meal followed by an acid pepsin mixture and, during the period of loose motions, sulphaguanidine or iodochloroxyquinoline in a regulated manner. For giardiasis, if there is no other contraindication (age and kidney disease) stovarsol is perhaps better (being amoebicidal as well) or chloroquine or mepacrine can be given. Vitamins are useful adjuncts in the treatment of these cases. Vitamin B complex helps much, although it sometimes causes loose motions and irregular bowel movements. However, wherever possible multivitamins should be prescribed rather than a single one, particularly when there is any suspicion of lung disease. Usually a multivitamin capsule brings back a sense of well-being and confidence in the patients.

These intestinal patients, as they may be called, are often irritable and suffer from anxiety states and insomnia or dreamy and light sleep. A small dose of phenobarbitone twice daily after principal meals often makes them cheerful and helps in quick recovery.

Loose motions associated with acidity and heartburn often respond to therapy with acid mixtures alone, or hydrochloric acid dilute 1 drachm or more in a pint of water daily may be given as a drink at intervals. These patients when suffering from progressive anaemia usually get the greatest benefit. One should remember that acidity and heartburn, often taken as symptoms of peptic ulcer, may be due to fermentative acids—an effect or hypochlorhydria and certainly these cases will respond to acids. It is not always possible to get the gastric content analysis report but a few doses of acid mixture may be given as therapeutic test for peptic ulcer also—as in this condition hydrochloric acid will definitely aggravate the patient's troubles.

Pain and tenderness in the right hypochondrium may be not only due to peptic ulcer or gall-bladder disease but also due to spasmodic irritation at the hepatic flexure of the colon ; a little careful observation will show characteristic peristaltic wave or a tympanitic percussion note suggestive of the actual condition. However, such patients should always be made to realise that it is no use trying treatment with different drugs alone unless they take sufficient amount of food—at least in

calories—chosen according to taste, and good rest at night, may be with some sedatives occasionally when simple. Menthol and digestive enzymes will pave the path of relief.

The use of antibiotics in these conditions is sometimes very helpful and gives prompt relief, particularly during the acute exacerbations, but reckless use should be always discouraged. The choice of the antibiotic has to be done on the assessment of the proper condition and should never be done one after another on a trial and error basis.

CASE NOTES

THREE CASES OF ACUTE NEPHRITIS OCCURRING SIMULTANEOUSLY IN A FAMILY FOLLOWING IMPETIGO CONTAGIOSA

B. B. MUKHERJEE, M.B., M.R.C.P. (LOND. & EDIN.)

AND

S. K. GHOSE, M.B.,

Sanctoria Hospital, Disergarh, Burdwan.

Three cases of acute nephritis occurred simultaneously in a family following impetigo contagiosa. The cases are reported as being of interest and because of their extreme rarity.

CASE REPORT

Case 1—Charan, 5 years, male, was admitted on 20-10-1954 with continued fever, cough and slight puffiness of the face and legs for 3 days. Temperature was 103°F with rales and rhonchi all over the chest. Red areas of impetigo contagiosa were found scattered over the body from which the patient had been suffering for the last six weeks. There was leucocytosis with total count 12,500 per c.mm. and polymorphs were 70 per cent. He was treated for acute bronchitis with penicillin injections. The temperature came down within 2 days but the oedema was more marked over the face and the legs. Urine examination showed moderate amount of albumin, red blood cells, epithelial and hyaline casts. Blood pressure was S/D=120/75 mm. of Hg. E.S.R. was 91 mm. in the 1st hour (Westergren). He was treated for acute nephritis. In 3 weeks' time the urine was completely free from albumin. He was discharged from the hospital on 16-11-1954.

Case 2—Surendra, 9 years, male, a brother of the above patient was admitted into the hospital on 22-10-1954 with swelling of the whole body including face for 5 days. Temperature was 99°F. Blood pressure was S/D=150/90 mm. of Hg. There was free fluid in peritonial cavity. Impetigo contagiosa—present over the body which had been there for 6 weeks.

Blood examination: Leucocytes 11,200 per c.mm. with polymorphs 73 per cent. E.S.R.—42 mm. in the 1st hour (Westergren). Urine showed moderate amount of albumin, red blood cells and hyaline casts. He was also treated for acute nephritis. In 3 weeks' time the urine was free from albumin. The blood pressure came down to S/D=120/80 mm. of Hg. He was discharged from the hospital on 16-11-1954.

Case 3—Chanda, 12 years, female, a sister of the above patients was admitted on 4-11-1954 with swelling of the whole body, including face, and fever for 3 days. Temperature was 99·2°F. The skin showed impetigo contagiosa scattered on the body from which the patient had been suffering for the previous six weeks. Blood pressure was S/D=120/70 mm. of Hg. Urine showed albumin and red blood cells. The blood count was within normal limits. E.S.R.—20 mm. in the 1st hour (Westergren). She was treated for acute nephritis. She was discharged from the hospital on 16-11-1954.

Follow up—Subsequent examination revealed occasionally presence of few red blood cells in the urine of the first patient. The urine of the second and third patients did not show any abnormality.

DISCUSSION

Patients belonged to a family of 7 brothers and sisters. The eldest one was 15 years old and the youngest was 3 years. All the children had impetigo contagiosa. There was no history of nephritis in the family. No other child in the family was reported to have any swelling of the body near about the period of hospitalization of the three patients noted above and as they were living at a distance from the hospital their urine could not be obtained for examination. The mother had also similar skin lesions. Her urine examined during the course of illness of her children, did not reveal any abnormality. The father was healthy.

Three cases of acute nephritis occurring simultaneously in a family have been described. As there was no history of sore throat, tonsillitis or any other form of illness excepting the skin infection in the preceding few months, the natural conclusion was that the nephritis developed as a complication of impetigo contagiosa. In one case however, the nephritis developed more or less simultaneously with a bronchial infection. It may be noted in this connection that acute nephritis is preceded in more than 80 per cent of cases by an acute streptococcal infection usually sore throat or tonsillitis and more rarely scarlet fever which may also be looked upon as a special variety of streptococcal sore throat.

Acute nephritis has also been found to develop following impetigo contagiosa which is primarily a streptococcal or staphylococcal infection but often progresses into a mixed infection. Impetigo contagiosa developing in adults is however more frequently staphylococcal in origin.

The important considerations arising in this connection are :

(1) Parents did not take any serious view of the impetigo contagiosa developing in the children. Practically no treatment was given for the impetigo and no steps were taken to prevent its spread from one child to another. (2) Age incidence—The three patients suffering from acute nephritis were of the ages of 5, 9 and 12 years. The mother who had the same type of skin lesions did not show any abnormality in urine. (3) Familial predisposition—Though the familial incidence is low, acute nephritis is known to have predisposition to occur in different members of the family. (4) Acute nephritis following impetigo contagiosa is comparatively rare. Its simultaneous occurrence in three members of the family raises the suspicion if a particular organism or a particular strain of an organism which is more prone to cause the complication of nephritis was concerned with the skin infection of the above cases. The factor of familial predisposition should not be overlooked in this connection.

Owing to the risk of causing so serious a complication as acute nephritis, impetigo contagiosa should not be ignored but treated with all the seriousness it deserves.

Public should be made conscious about the seriousness of impetigo contagiosa (because of the complication it can give rise to) so that early treatment is instituted and steps are taken to prevent its spread to others.

When one child in a family suffers from acute nephritis following impetigo, it may be worth examining the urine of other children having the same skin lesion particularly for detection of mild cases which may otherwise escape detection.

AURICULAR ARRHYTHMIAS

R. M. KASLIWAL, M.D., M.R.C.P., D.T.M. & H.

AND

B. S. MITAL, M.B.B.S.

Department of Medicine,
S.M.S. Medical College and Hospital, Jaipur.

Some cardiologists of the Viennese school were the first to believe in the unitary nature of all auricular arrhythmias. Lewis himself first believed in the existence of one underlying mechanism of these arrhythmias. In the later years he abandoned this view and explained flutter and fibrillation by a different mechanism, a circus movement. Thus, for more than 30 years the four auricular arrhythmias were explained by two different mechanisms : auricular extrasystole and tachycardia by ectopic foci, flutter and fibrillation by circus movement.

Clinicians have always observed a similarity between all these arrhythmias, based on the following observations. The most common being the appearance of auricular extrasystoles before the onset of auricular fibrillation, the changing of auricular tachycardia to fibrillation and, finally, the difficulty encountered in interpreting the E.C.G. of auricular tachycardia, in certain cases one electrocardiologist may call flutter and the other auricular tachycardia. Other clinical observations pointing to the one underlying mechanism are, the existence of two or more arrhythmias in the same patient at different times; at times even in a few seconds a change occurs. The strongest point of a unitary origin of all auricular arrhythmias is the similarity of their therapeutic response to quinidine. The above mentioned observations could not be explained by two different mechanisms but there was nothing to disprove the theory of circus movement nor was there an evidence of a common mechanism underlying these arrhythmias.

Recent work of Prinzmetal *et al* (1952) has disproved the existence of a circus movement in auricular flutter. They could produce various types of arrhythmias by applying aconitine solution to auricules in animals or by means of electrical stimulation. These experimentally produced arrhythmias were in no way different from those occurring spontaneously. They have also produced these arrhythmias in human beings during thoracic or cardiac operations by directly stimulating the auricles. This experimental work has given a strong support to the view of the unitary nature of auricular arrhythmias.

According to Prinzmetal *et al* (*loc. cit.*) the type of auricular arrhythmia depends on the rate of discharge of stimuli from the ectopic focus. By changing the strength of aconitine solution all the four arrhythmias could be produced. They could change the arrhythmia or abolish it by cooling the ectopic focus.

When the rate of stimulus formation is less than that of the sinus node it gives rise to auricular extrasystoles; if the rate is more than that of the sinus, the ectopic focus assumes the work of pace-maker and gives rise to auricular paroxysmal tachycardia. A further increase in the stimulus formation between 300 to 400 gives rise to flutter. As the ventricles cannot beat at this rapid rate, the physiologic A-V block comes into operation and thus reduces the ventricular rate. This block may be variable, giving rise to an irregular ventricular rate. A rate of 500 or more gives rise to fibrillation.

The rate of discharge of stimuli from the ectopic focus depends on the strength of the stimulus and on the condition of the myocardium.

Case Report

Case 1—R, Hindu female, aged 30 years, was admitted on 10-2-1954 with the following complaints. Palpitation and pain in abdomen, 15 days. Oedema over feet, breathlessness for the last 9 days. She looked ill-nourished. She had stomatitis and a few enlarged glands, the size of a gram grain in axilla and posterior triangle of the neck.

Pulse 198 per minute, regular. B.P.—S/D-80/30. Apex beat was in the 5th left intercostal space, one inch outside the midclavicular line and there were systolic pulsations in the epigastric region. Liver was enlarged and tender. Knee and ankle jerks were absent. E.C.G. showed paroxysmal auricular tachycardia. As the patient had signs of heart failure and showed no response to vagus stimulation, she was put on digoxin, two tablets (0·25 mg. each) three times a day.

Laboratory data: R.B.C. 2·4 million per c.mm., Hb 50 per cent per 100 c.c., venous pressure 22 cm. of water, Kahn's test negative. Screening showed enlarged cardiac shadow. B.M.R. (28-2-54) was +12. Gland biopsy showed hyperplasia.

On 12-2-54, after taking 3·5 mg. of digoxine her heart rate was still 172 per minute, but oedema had disappeared and she felt better. Considering her stomatitis, absence of knee and ankle jerks and her poor general condition that she suffered from a vitamin B complex deficiency, she was put on a heavy dose of vitamin B-complex with 25 c.c. of 25 per cent of glucose I.V. and liver extract 2 c.c. I.M. daily. The following day her heart rate dropped to 72 per minute and she felt much better. Pulse was slow but irregular. E.C.G. showed auricular fibrillation (Fig. 1). Next day (15-2-54) pulse was slow but irregular and E.C.G. showed auricular flutter with varying block. From the standard limb leads, it would have passed as fibrillation but after seeing lead CR_1, there was no doubt that the arrhythmia was due to auricular flutter with varying block. On slight exertion the heart rate went upto 170 per minute but was regular. On 28-2-54, the pulse rate was 62 per minute and regular.

On 2-3-1954 E.C.G. showed: rate 100 per minute, P-R = 0·16, P_1 low positive and $P_{2, 3}$ were inverted. This type of rhythm is called "coronary

FIG. 1 (Case 1)

sinus rhythm" (Scherf and Harris 1946). This is a type of "upper" A-V rhythm with normal or almost normal P-R interval. Ten days after (12-3-54), with little exercise, the heart rate went upto 220 per minute, but within half an hour it came down gradually to 74 per minute and E.C.G. showed regular sinus rhythm. After 23-3-54,

there was no variation in heart rate after exercise. On 19-4-54, after climbing 48 steps there was no change in the heart rate. E.C.G. was normal.

Case 2—D, Hindu female, was admitted with congestive heart failure. She was admitted thrice in last 12 months for the same complaint. There was a definite history of rheumatism at the age of 10 years and again at the age of 15 years. Her complaints started after a normal confinement 2 years back.

Heart rate 100 per minute, regular. A low-pitched rumbling murmur was heard throughout the diastole in the mitral area. Liver was 3 fingers enlarged and tender and there was slight oedema of the feet.

About 2 hours after admission pulse became irregular, and the E.C.G. (immediate) (Fig. 2) showed :

Lead I—Auricular fibrillation and premature auricular systole. Lead II—Fibrillation only. Lead III—Flutter and fibrillation. Lead V_1 showed alternating flutter and fibrillation.

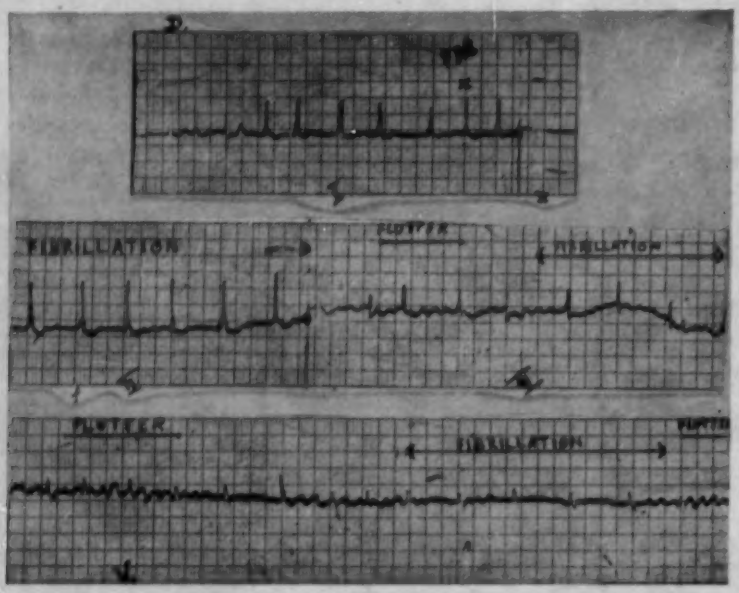

FIG. 2 (Case 2)

DISCUSSION

Case 1 is of auricular paroxysmal tachycardia which subsided after administration of heavy doses of vitamin B complex and showed arrhythmia, changing often within a short period from auricular tachycardia to fibrillation, then to flutter, 'coronary sinus rhythm" and back again to normal sinus rhythm.

Remarkable was also the effect of exercise on the heart rate. In the beginning it used to take some days for the heart rate to come down, in the course of time and as the B complex deficiency improved the heart rate came down within a short time. Digoxin failed to reduce the heart rate but use of B complex intravenously brought down the heart rate within 24 hours.

In Case 2 the presence of the arrhythmias described throws light on the unitary nature of auricular arrhythmias because, if not impossible it is highly improbable for the existence of two different types of arrhythmias having radically different mechanisms in a single heart in the course of few minutes.

SUMMARY

Two cases of auricular arrhythmias are reported which suggest unitary nature of these arrhythmias. In one case arrhythmia subsided after giving heavy doses of vitamin B complex and arrhythmias, changing often within a short period.

In the second case premature systole, flutter and fibrillation were seen in the course of a few minutes. This rapid change is unlikely with two different mechanisms.

ACKNOWLEDGMENT

We are highly grateful to our Honorary Consulting Physician, Dr. Robert Heilig, for help and advice.

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JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, JUNE 16, 1955

ADRENALECTOMY

The removal of a diseased organ, when other therapeutic measures fail, may be a rational procedure. But sometimes even an otherwise healthy organ is removed for its remote influence in the body. This applies mostly in regard to ductless glands. One of the early operations of the nature, is oophorectomy for the late stage of mammary cancer introduced first by George Beatson[1] as early as 1896. Orchidectomy for prostatic cancer and thyroidectomy for certain heart diseases are other notable examples. In recent years the adrenal gland is being extirpated for diseases other than its own, such as the late stage of mammary cancer, prostatic carcinoma and intractable hypertension especially during the malignant phase.

Bilateral adrenalectomy is not compatible with life. Besides the high operative mortality, the only slender hope of sustaining life in such patients, in the past, was in the use of various cortical extracts, DOCA and a regulated diet. With the advent of cortisone and hydrocortisone and due to their ready availability, maintenance of life in adrenalectomised patients has become a more feasible proposition.

The removal of a tumour or diseased adrenals has been practised for a long time. Partial or complete adrenalectomy for Cushing's syndrome due to adrenal tumour is an established procedure. In Cushing's disease due to pituitary adenoma, associated with bilateral adrenal cortical hyperplasia, subtotal or total adrenalectomy has also been performed with spectacular success. But attention is now focused on the pituitary origin of the disease and electrocoagulation of hypophysis caused remarkable improvement in the case reported by Arner *et al.*[2] It has been rightly put by Gordan[3] "perhaps the best proof of pituitary origin of Cushing's disease with secondary bilateral adrenal cortical hyperplasia is the report of Weller[4] who irradiated the pituitary of a patient with Cushing's disease and converted him into an Addisonian." In congenital hyperplasia of adrenals, giving rise to virilism, subtotal adrenalectomy has been reported to give gratifying results. Adequate dosage of cortisone may also be administered to repress the function of the hyperactive adrenal cortex by depressing the hypophysis. This hypothesis has been elaborated by the recent work of Jailer[5] who thought that the defect is in the congenitally weak cortex which fails to synthesise hydrocortisone from its precursor. Anterior pituitary for lack of adequate circulating hydrocortisone in the body, whips the adrenal cortex by producing more corticotropine hormones. This causes hyperplasia of the cortex which due to its congenital defect, fails to produce hydrocortisone and instead produces only excessive quantity of 17-hydroxy-progesterone, an androgen, to cause virilism.

The introduction of total or subtotal adrenalectomy in conjugation with or without sympathectomy has opened up a new line of approach for severe and intractable cases of hypertension, specially hitherto incurable cases of malignant hypertension. The role of the adrenal cortex in essential hypertension is debatable. The evidences from intensive experimental and clinical work point to the fact that at least the salt retaining hormones of the cortex are important for the maintenance of hypertension in some cases. This was suggestive from the classical work of Goldblatt[6] and subsequently supported by Page[7], who found that production and maintenance of hypertension was difficult in the dog after total adrenalectomy. The classical work of Selye *et al*[8] in the production of vascular lesion in animals by large dosage of DOCA is also well known. The occurrence of hypotension in Addison's disease and hypertension in Cushing's syndrome lends strong support to this hypothesis. Thorn and his colleagues reported two cases of hypertension who subsequently developed Addison's disease with lowering of blood pressure to normal or even subnormal level and with checking of further changes. Treatment in one of these with DOCA resulted in restoration of blood pressure to former level with progression of vascular change. Gordan[9] also mentioned 5 such cases under his observation. According to Schroeder[9], "The working hypothesis of best fit is as follows: Adrenal cortical steroids of 11-desoxy type produce changes in the intracellular concentration of sodium. Nerve fibres and (possibly ganglia), especially unmyelinated autonomic ones, are affected. The increased concentration of intraneural sodium results in hyperactivity of nerve. The extracellular concentration of

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[2] *J. Clin. Endocrinology*, **13** : 1101, 1953.
[3] The Year Book of endocrinology, 1953-54 series.
[4] *Arztl. Wchnschcr.*, **7** : 818, 1952.
[5] *Bull. New York Acad. Med.*, **29** : 377, 1953.
[6] *Ann. Int. Med.*, **11** : 69, 1937.
[7] *Am. J. Physiol.*, **122** : 382, 1938.
[8] *Proc. Soc. Exper. Biol. & Med.*, **44** : 105, 1940.
[9] Hypertensive diseases, 1953, Lea & Febiger, Philadelphia.

sodium may be normal or slightly elevated." Though not universally accepted the view points to a definite role of adrenal cortex in some types of essential hypertension.

Although according to the prevailing idea, the adrenal cortex is incriminated at least in some way, for essential hypertension, adrenalectomy as a treatment for the essential hypertensive was performed at first by De Courcy[10] in 1934, on the belief that adrenal medulla was concerned in the production of hypertension. Investigation along this line has only been intensified in recent years. Total and partial adrenalectomy in conjunction with various types of sympathectomy are being tried.[11, 12, 13] The results reported are sufficiently encouraging for further trial but surely do not warrant its widespread clinical adoption as yet.

The operation if contemplated should be done only in cases with malignant phase of the disease or in severe cases complicated with intractable cardiac failure. Removal of the source of salt retaining hormones by such procedure leads to increased excretion of sodium with amelioration of congestive cardiac failure and pulmonary oedema. In the early and intermediate groups of hypertensive cases, such a drastic procedure is out of question. Moreover, in presence of marked renal impairment, the result is unfortunately disappointing and thus limits the field of its utility in the management of malignant hypertensive cases where it is most needed.

Adrenalectomy for the late stage of breast cancer is rather a new innovation. The application of this measure was based on the experimental and clinical works in recent years on the role of sex hormones in the production and maintenance of carcinomatous growth specially of the breast and the prostate. One of the hypotheses is that oestrogen is incriminated for the maintenance of breast cancer and the benefit which follows castration, administration of androgen, adrenalectomy and hypophysectomy, is by way of eliminating or neutralising oestrogen in the body. But curiously enough, satisfactory results sometimes occur in the relief of breast cancer, specially with metastasis in soft parts, by administration of massive doses of oestrogen itself. This has been explained as due to depression of hypophyseal activity by oestrogen. However, the whole problem of hormonal make-up in malignant diseases still remains in the melting pot.

Following the observations of Huggins and Bergenstal[14, 15] that cortical hormones sustain mammary cancer and their withdrawal results in regression in many cases, this method of treatment has been adapted by others as well. They postulated that removal of ovaries is followed by hyperplasia of the cortex with increase in cortical hormone which sustains the malignant growth even after oophorectomy. Moreover, they found that even after removal of both the ovaries, women continued to excrete some oestrogen which ceases after adrenalectomy. Huggins and Dao[16] reported their results on 55 cases. There was 5·5 per cent operative mortality. In 10 cases out of 25 patients without ovarian function, where only adrenalectomy was done, there was profound regression of lesion. Out of another 25 cases where both adrenalectomy and oophorectomy were done, 10 had remission of the disease with objective evidences of improvement. Cade[17] in Great Britain published his results on 56 cases with 13·6 per cent operative mortality. About 60 per cent of cases achieved beneficial effects and in 23 per cent the improvement was remarkable.

Not all types of breast cancer are amenable to this form of treatment. About one-third of the cases are refractory to any change in the sex hormones environment of the body. Unfortunately there is as yet no way of predicting beforehand the effect of such procedure. But the risk involved seems quite reasonable in an otherwise hopeless case where surgery and radiotherapy have failed.

The operative risk of bilateral adrenalectomy, which has got to be done under the umbrella of cortisone and hydrocortisone therapy specially in the type of cases who are invariably in the category of "poor risk" patients, is undoubtedly great. The post-operative management of these patients with substitution therapy is much more difficult than in ordinary Addison's disease. Regular administration of cortisone is imperative, and withdrawal of the drug will precipitate an Addisonian crisis within 48 hours. Moreover, cortisone requirement in these cases increases during any infection or other form of stress and constitute a real danger in their management.

Undoubtedly bilateral adrenalectomy is a mutilating operation which is drastic as well as unphysiological. Yet this may be the only chance of prolonging a useful life which could not be saved by any other method at our command uptil now, and the risk involved may be amply rewarded, at least in some cases.

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[10] *Ann. Surg.*, **100** : 310, 1934.
[11] THORN, G. W., *et al—Ann. Int. Med.*, **37** : 972, 1952.
[12] JEFFERS, W. A., *et al—Ann. Int. Med.*, **41** : 221, 1954.
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[14] *J. A. M. A.*, **147** : 101, 1951.
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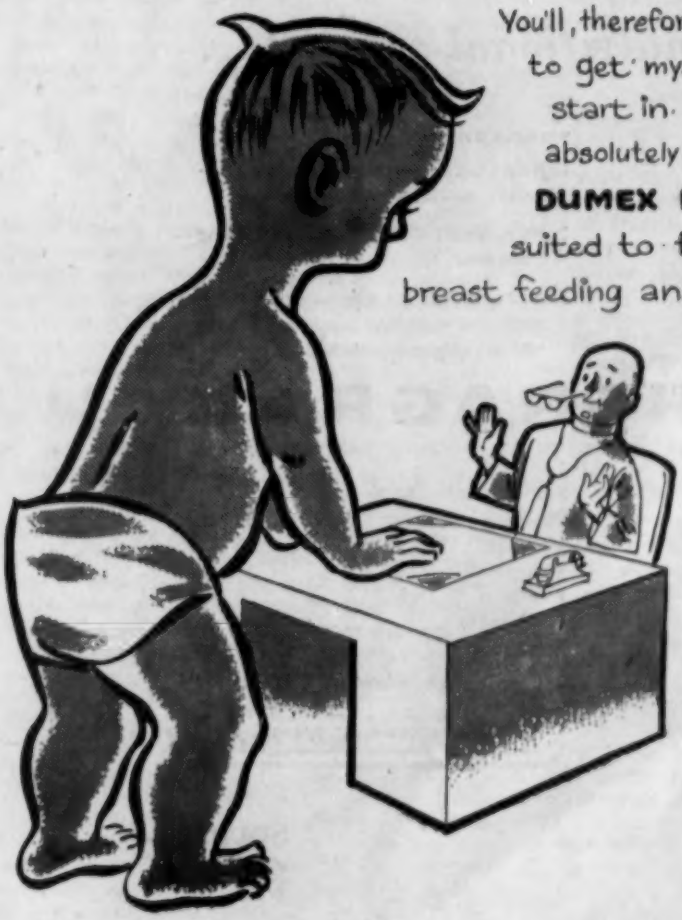
[16] *J. A. M. A.*, **151** : 1388, 1953.
[17] *Brit. M. J.*, **1** : 1, 1955.

I concede, of course, doctor, that there's nothing like mother's milk, but what happens when mother cannot feed me? And in any case, after five months, you know, mothers milk often does not suffice. And what with all this I hear about the extreme importance of the first two years of life in determining the physical development achieved at maturity, I just cannot be too careful. They even tell me that there's a definite relation between height at two years and that at maturity. Just imagine!

if my word counts it will be **DUMEX Baby Food**



You'll, therefore, understand my anxiety to get myself off to a good start in life. Now I hear from absolutely dependable sources that **DUMEX BABY FOOD** is ideally suited to fill the gap between breast feeding and the intake of solids

So, for me, doctor, let it be **DUMEX BABY FOOD.**

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SQUIBB

CURRENT MEDICAL LITERATURE

Tongue Appearance and Serum Albumin Level in the Assessment of Nutritional Status

GANDEVIA AND HOSSACK (*M. J. Australia*, **1** : 344, 1955) give in the following lines the summary of their observation on tongue appearance and serum albumin level in the assessment of nutrition status with reference to the efects of a protein-rich diet :

Tongue grade was estimated in accordance with the scale given by Bolton. The grades are as follows : grade O, a normal tongue covered by normal papillae; grade I, a swollen, oedematous tongue, as shown by the indentations produced at the edges by the teeth; grade II, a tongue with smooth edges and tip, the papillae at these sites becoming worn down and atrophic; grade III, a tongue with hypertrophic papillae towards its centre, fusion of which produces early fissuring and "cracking" on the upper surface, the edges being smooth; grade IV, a mammillated tongue, most of the papillae having atrophied; grade V, a smooth, shiny, completely atrophic tongue.

In a series of 24 students living at home, the mean grade of tongue change was significantly less, and the mean serum albumin content significantly higher, than in a series of 16 students living in institutions.

After two weeks on a protein-rich diet, the institution students showed significant improvement in mean tongue grade and serum albumin level, the values becoming identical with those for the home student series.

Statistical analysis indicates that tongue grade and serum albumin content, or more particularly the appropriate mathematical combination of these, are relatively sensitive indices of group nutritional status in respect to protein, a finding which has wide practical application in studies of human nutrition.

The clinical significance of these observations is briefly discussed, with particular reference to the influence of dietary protein intake on blood volume, and on serum albumin and haemoglobin concentrations.

Management of Refractory Oedema in Heart Failure

RUBIN AND OTHERS (*Ann. Int. Med.*, **42** : 158, 1955) write that in the early stages of congestive heart failure most patients can be maintained oedema free by such measures as limited activity, the use of digitalis, a low salt diet or occasional mercurial diuretic injections. Ultimately, however, in the natural history of congestive heart failure most patients progress to the point at which they require more vigorous application of therapeutic measures often including the daily injection of mercurial diuretics. As the disease progresses the most patients develop a relatively refractory state.

In the experience of the authors most patients with refractory oedema do not have electrolyte imbalance prior to vigorous treatment and in the study under review, in nine episodes of refractory oedema due to congestive heart failure, restoration of responsiveness to mercurial diuretics was accompanied by the production of a hyperchloraemic acidosis.

In patients with oedema due to refractory heart failure, no significant diuresis has resulted from the use of 'Diamox' (carbonic anhydrase inhibitor) alone. A hyperchloraemic acidosis of moderate degree has been produced irrespective of diuretic response. Following cessation of 'Diamox' therapy, in the setting of hyperchloraemic acidosis, restoration of responsiveness to mercurial diuretics has been observed in some patients. However, the moderate hyperchloraemic acidosis produced by 'Diamox' is often of insufficient magnitude to restore adequately responsiveness to mercurial diuretics. The hyperchloraemia and acidosis may be potentiated by the concomitant or consecutive administration of ammonium chloride in as large amounts as tolerated, usually 8 to 10 g. daily. By this means a hyperchloraemic acidosis with plasma chloride levels as high as 129 mEq. per liter and plasma pH as low as 7·14 has been produced. No untoward effects of either the hyperchloraemia or the acidosis have been observed in this study. In the setting of a sufficient degree of hyperchloraemic acidosis, all patients with refractory oedema whom the authors have studied have then responded to mercurial diuretics by diuresis to the desired body weight. In many instances the state of congestive failure has been markedly improved by removal of oedema fluid in this manner.

Cardiac Glycosides in Cardiogenic Shock

GORLIN AND ROBIN (*Brit. M. J.*, **1** : 937, 1955) write that four patients, one in clinical shock and three with shock and pulmonary oedema, were treated primarily with a cardiac glycoside, intravenously in small doses. All four patients showed remarkable clinical response, with a rise in blood pressure, decrease in pulmonary oedema, and dramatic clearing of coma. Three of the four ultimately survived. It is re-emphasized that the shock of myocardial infarction represents true myocardial failure and that the use of digitalis may be highly efficacious. When given, digitalis should be administered in doses fractionally 25-50 per cent of the initial dose given to the average cardiac patient. In so doing many of the toxic complications may be avoided.

Vitamin K_1 as an Antidote to Anticoagulants

GEILL AND OTHERS (*Scand. J. Clin. & Lab. Invest.*, **6** : 203, 1954, Ref. *Practitioner*, **174** : 232, 1955) recommend the intravenous administration of 10 to 20 mg. of a sterile aqueous colloidal solution of vitamin K_1 as an antidote to excessive dosage with dicoumarol or phenylindanedione. This conclusion is based upon the results they obtained in 40 individuals over the age of 60, none of whom showed signs of liver disease. With this dosage, a therapeutic effect was obtained within two hours. The higher dosage recommended by some workers is considered unnecessary and can be dangerous by favouring thrombosis. They found menaphthone (menadione) to be unsatisfactory and unreliable and state that 'treatment with menadione and its simpler derivative must be considered of no value because of the low and uncertain efficiency of these compounds in counteracting the hypoprothrombinaemia caused by dicoumarol anticoagulants'.

Effect of Oxytetracycline Therapy of Streptococcal Sore Throat on the Incidence of Acute Rheumatic Fever

CATANZARO AND OTHERS (*Ann. Int. Med.*, **42**: 345, 1955) report on the results of treatment of 506 patients with streptococcal exudative pharyngitis with oxytetracycline administered for five days. Four hundred eighty patients who received no specific therapy served as controls.

In the dosages employed, oxytetracycline reduced the convalescent streptococcal carrier rate 55 per cent as compared to the control group. In addition, the average antistreptolysin response in the treated patients was 49 per cent less than that observed in the control patients. Maximal inhibition of antibody production occurred in the treated patients in whom the infecting organism was eliminated.

Recurrent pharyngitis occurred more frequently in the treated group, particularly in those patients who remained carriers. The second clinical illness usually developed within two to three weeks after therapy had been discontinued. Suppurative complications were of infrequent occurrence in both groups.

Rheumatic fever developed within 35 days after the onset of the streptococcal infection in 12 patients in the control group and in five patients in the group treated with oxytetracycline. The attack rate was reduced, therefore, from 2·94 per cent in the control group to 0·99 per cent by therapy with oxytetracycline (P=0·07).

Combined Pentolinium Tartrate with Rauwolfia in Essential Hypertension

BAINS AND OTHERS (*Brit. M. J.*, **1**: 817, 1955) write that the autonomic ganglion-blocking agent pentolinium tartrate (pentapyrrolidinium; "ansolysen") is acknowledged to be an effective agent in the control of hypertension. Difficulties have been experienced in its continued use because of the unpleasant effects of its indiscriminate ganglion-blocking activity—for example, constipation, dry mouth, visual disturbance, etc.—which accompany the hypotensive activity.

The authors present a short series of cases in which stabilisation had been achieved on pentolinium tartrate alone and which were later restabilised on that drug with the addition of rauwolfia alkalaids ("rauwiloid" 4 mg.), taken in a single dose each evening.

All the patients had essential hypertension. Their blood pressure before treatment varied from 300/160 to 240/130. None had evidence of renal involvement. The average dose of pentolinium tartrate when given alone was 840 mg. a day. The average daily dose of that drug when combined with rauwolfia alkaloids was 240 mg., a reduction of over two-thirds. One patient who required 440 mg. of pentolinium tartrate a day was restabilised on the combination with 60 mg. a day.

The corresponding decrease in the undesirable effects of the ganglion-blocking agent was very great, and some patients who had found it impossible to continue with pentolinium tartrate alone are now well stabilised and able to live active lives.

Treatment of Hypertensive Retinopathy

PLATT (*Quart. J. Med.*, **23**: 441, 1954) on the basis of the results in a series of 39 patients with hypertensive retinopathy treated with hypotensive drugs concludes that 'in most cases, if the patients are not advanced in renal or cardiac failure before treatment is attempted, great improvement in the retinopathy can be achieved with restoration of vision'. Most of the patients were given 'ansolysen' (pentolinium tartrate) or 'ansolysen retard'. All patients were admitted to hospital for the initiation of treatment and stabilization of dosage—usually a period of three weeks. Initial dosage was usually 2·5 mg. of 'ansolysen retard' twice daily by injection. The usual maintenance dosage was 10 to 20 mg. twice daily. Particular care is required in the presence of severe renal insufficiency. 'Retinal improvement, which in the majority of cases was striking, vision being restored to normal although the retinopathy had been severe', was noted in the 14 patients who had undergone treatment long enough to be able to assess the effects. These results are described as 'very encouraging, the restoration of vision bringing happiness and hope to both patient and doctor', but attention is drawn to the fact that ten of the patients died after (but not as a result of) treatment; three of these had shown 'great visual improvement'. The view is expressed that 'obviously the best group of cases for treatment is that in which retinal changes have occurred before renal or cardiac disease is far advanced'.

Fatal Agranulocytosis During Treatment with Chlorpromazine

TASKER (*Brit. M. J.*, **1**: 950, 1955) describes in detail the history of a case who developed fatal agranulocytosis during treatment with chloropromazine for her mental condition. She was having 150 mg. of the drug daily. On the 11th, 15th and 22nd day she developed transient fever, jaundice and skin rashes respectively as complications. After 41 days' treatment with chlorpromazine receiving 5·475 g. of the drug the patient developed ulceration of gums and tongue and her temperature rose to 101°F. An immediate blood count showed only 900 white cells per c.mm. (poly, 10 per cent and lympho, 90 per cent) when a diagnosis of agranulocytosis was made. Chlorpromazine was stopped at once and the patient was admitted to the hospital. Inspite of withdrawal of the drug and treatment with antibiotics she deteriorated and developed a terminal lobar pneumonia and succumbed to it seven days after admission at the hospital and seven weeks after starting treatment with chlorpromazine.

The case, the author writes, suggests that evidence of sensitivity to chlorpromazine should be treated with respect. Fever, jaundice, skin eruptions during the early weeks of treatment should be taken as danger signals and should compel repeated examinations of the blood, if not withdrawal of the drug. Ulcerative stomatitis, particularly if it occurs at about the sixth week of treatment, should be an absolute indication for the immediate cessation of chlorpromazine therapy.

Treatment of Asthma

BERNSTEIN AND OTHERS (*J. A. M. A.*, **157**: 811, 1955) write that the treatment of patients with bronchial asthma ultimately depends on its cause. Emergency treatment is usually directed at relieving only a symptom, and the prime requisite of immediate therapy is the prompt and safe procurement of an adequate airway. Epinephrine is still the drug of choice for prompt relief. Aminophylline is dependable for bronchial relaxation, and potassium iodide is a time-proved remedy when expectorant, liquefying action is required. Oxygen may be needed temporarily. The use of morphine is still prohibited, and meperidine (Demerol) hydrochloride is to be used rarely. Safe sedatives are of great value. Corticotropin and cortisone represent important additions in the treatment of patients with allergies, and particularly in status asthmaticus, with pitfalls that must constantly be kept in mind. The antihistamines are of use only in patients with 'wet' asthma. Various other aids in the treatment of asthma include aerosols, fever therapy, Piromen, trypsin, mechanical respirators, and breathing exercises.

Psychogenic factors and psychotherapy occupy prominent positions in the diagnosis and treatment of patients with asthma. Thorough medical and allergic investigations must be made. The best treatment for patients with bronchial asthma is prevention, by treating the precursor state before asthma occurs. Effective treatment for asthma has now become polyphasic and a wide range of modalities is employed: pharmacentic, endocrine, antibiotic, psychological, and physiotherapeutic. As a guide for basic orientation in this field it is not amiss to remember that at one time the union of allergen and reagin was held almost solely responsible for the entire train of events known as bronchial asthma.

Cyanocobalamin and Folic Acid in Viral Hepatitis

CAMPBELL AND PRUITT (*Am. J. M. Sc.*, **229**: 8, 1955) write that cyanocobalamin (vitamin B_{12}) and folic acid are of value in the treatment of viral hepatitis. The investigation upon which this conclusion is based was carried out on U.S. army personnel in Japan. During the first ten days in hospital a group of 44 patients received 30 micrograms of cyanocobalamin intramuscularly every other day and 5 mg. of folic acid orally thrice daily. A comparable group of 44 patients acted as the control group. Of the 30 patients in the experimental group who had anorexia, 83 per cent had a return to normal appetite in the first week, compared with only 36 per cent of the 24 patients in the control group who had anorexia. There was no significant difference between the two groups in the rate of recovery from nausea, vomiting and malaise, and the incidence or duration of hepatomegaly. Six weeks after the onset of illness, 60 per cent of the experimental group had normal serum bilirubin values, compared with 27 per cent of the control group. After eleven weeks all the patients in the experimental group had normal values, but it was eighteen weeks before all the control group had returned to normal in this respect. During the fifth week of illness, 70 per cent of the experimental group had normal bromsulphthalein determinations, compared with only 30 per cent of the controls. Of the moderately severe and severe cases, those in the experimental group recovered ten to seventeen days sooner than those in the control group. The over-all length of illness of the experimental group was 47·5 days, compared with 57·2 days for the control group.

Concomitant Gastric and Duodenal Ulcers

JOHNSON (*Lancet*, **1**: 266, 1955) in dealing with special significances of concomitant gastric and duodenal ulcers observes:

Gastric and duodenal ulcers occur in quite different sorts of people. The question therefore arises why ulcers should sometimes be found in the stomach and the duodenum of the same patient.

The incidence of concomitance of duodenal and gastric ulcers is probably about 5 per cent if symptomless ulcers are included. Of ulcer patients who come to hospital for investigation about 7 per cent have both duodenal and gastric lesions. Surgeons, however, commonly see a greater proportion of such patients, and there were 9 per cent in a surgical series of 311 cases.

The duodenal ulcer is the first to appear.

The patients have a secretion pattern which lies between that of patients with duodenal ulcer and that of patients with established pyloric stenosis. It is much less like the secretion pattern of gastric-ulcer patients.

A substantial majority of patients with concomitant ulcers have gastric retention and many have gross pyloric stenosis. Some 16 per cent of patients admitted to hospital with pyloric stenosis have gastric ulcers as well.

At operation the commonest finding is an active gastric ulcer and a healed, scarred duodenal one.

12 additional cases are described which illustrate how gastric retention from causes other than duodenal ulcer may also be complicated by the development of gastric ulcers.

9 cases are reported of peptic ulcers associated with hiatus hernia. It is suggested that reflux oesophagitis may sometimes cause hiatus hernia (instead of *vice versa*) and reflux may in turn be caused by duodenal ulcer and gastric retention. Gastric retention may also apparently cause gastric ulcer, and the association of these lesions may be thus explained.

Patients with concomitant ulcer are particularly prone to have haemorrhages, and when they do it is usually the gastric ulcer which bleeds.

Once concomitant ulcers have become established, elective surgery is four times more dangerous than in cases of solitary ulcers.

The bearing of these observations upon the treatment of patients with concomitant gastric and duodenal ulcers is discussed. (*Author's summary*).

Endocrine Therapy in Carcinoma of the Prostate

CARROL AND BRENNAN (*J. A. M. A.*, **157**: 881, 1955) write:

The only group of patients with carcinoma of the prostate who do not require endocrine therapy are those

in whom the cancer has not extended beyond the capsule of the prostate. This group is becoming larger since palpation of the prostate gland has become a part of the routine physical examination of men over 50 years of age. Borderline candidates for radical surgery are being included in this group by vigorous endocrine therapy. The interstitial injection of radioactive gold in prostates with nominal amounts of metastases is being studied, but complete eradication is probably not to be expected by this method. Conclusive evidence as to the relative value of combining endocrine therapy with orchiectomy as soon as the diagnosis is made or of withholding orchiectomy until regression recurs is still lacking. The results obtained by the urosurgical survey, Alyea, and the authors would suggest that both treatments be given immediately. The treatment for the recrudescent carcinomatous prostate is still unsatisfactory. Intramuscular injection of hydrocortisone every other day and administration of chlorotrianisene (TACE) daily seem to be the best palliative treatment. Orchiectomy should be performed if it has not already been done. Surgical adrenalectomy and cortisone adrenalectomy do not cause regression of the lesion or shorten the survival time but may give relief of pain. Chlorotrianisene, one of the newer syntheticestrogens, appears to have greater value than others in both laboratory and clinical observations, owing to the fact that it is stored in the fat and therefore liberated regularly and apparently does not activate the adrenal or pituitary gland. It also has few side-effects and is tolerated over a long period of time.

Hirsutism in Hypothyroid Children

PERLOFF (*J. A. M. A.*, **157**: 651, 1955) writes that unusual but typical hirsutism, involving the back, shoulders, outer aspects of the arms and legs, and to a lesser degree the sides of the face, may be a manifestation of hypothyroidism in children, since four hypothyroid patients with this type of hair growth were either completely or almost completely relieved after six to eight months of therapy with desiccated thyroid.

Mephenesin in Myoclonic Epilepsy

KELLY AND LAURENCE (*Brit. M. J.*, **1**: 456, 1955) write that though it has hitherto been impossible to control the myoclonus of progressive myoclonic epilepsy with drugs, five cases are reported, in four of which helpless patients were restored to activity temporarily by intravenous mephenesin; one less severe case was helped by oral mephenesin.

Owing to the very large doses necessary, various side-effects occurred; these were largely overcome.

The mechanism of the action of mephenesin in this disease remains unknown.

Complementary Feeds—By Spoon or Bottle?

ILLINGWORTH AND BARLOW (*Arch. Dis. Childhood*, **29**: 422, 1954, Ref. *J. A. M. A.*, **157**: 623, 1955) write that if complementary feeds are given during the period when lactation is established they should only be given by spoon. The authors quote Naish among others as saying: "Once a baby is introduced to the bottle, there is a very great danger that it will either refuse the breast entirely, or work the breast insufficiently, so that the milk supply is inadequately stimulated." Since it takes much longer to give complementary feeds by spoon, the authors decided to conduct a controlled experiment in order to determine whether this method of giving complementary feeds is really necessary. One hundred full-term babies were studied, 50 being given their complementary feeds by spoon and 50 by bottle. It was found that the giving of complementary feeds by spoon instead of by bottle presented no advantage in relation to the incidence of breast feeding and the effect on the mother's breast milk production. The slight differences in the two groups, though not of statistical significance, were in favour of the bottle-fed group.

CURRENT TOPIC

CHILD HEALTH PROTECTION IN THE U.S.S.R.

(A note by Dr. L. K. Shorniakova of USSR, who visited certain centres of medical education in India during the latter half of January 1955—translated by the interpreter, Mr. V. Pavlichenko.)

Mother and child protection in the U.S.S.R. is based on the complete legal and economic emancipation of women and on the fact that they have equal rights with men.

Women in the U.S.S.R., the Constitution of the Soviet Union reads, are accorded equal rights with men in all spheres of economic, government, cultural, political and other public activities. The possibility of exercising these rights is ensured by the fact that women are accorded an equal right with men to work, payment for work, rest and leisure, social insurance and education, and by the state protection of the interests of mother and child, state aid to mothers of large families and unmarried mothers, maternity leave with full pay, and the provision of a wide network of maternity homes, nurseries and kindergartens. The number of nurseries, kindergartens, consultation centres, etc. has been rapidly growing since the first years of existence of the Soviet state.

The network of establishments for children has particularly expanded since the law of June 27, 1936 was passed, prohibiting abortions, increasing material aid to mothers, granting state aid to mothers of large families, expanding the network of maternity homes, nurseries and kindergartens. In 1936, the Government appropriated 2,174 million rubles for the construction of children's institutions and maternity homes. In the four years that followed the publication of the law 200 maternity homes with 17,000 beds were built in the country as well as new creches to accommodate 213,000 children, and 373 milk kitchens.

On July 8, 1944, the Supreme Soviet of the U.S.S.R. passed an act providing for "an increase in state assistance to expectant mothers, mothers of large families and unmarried mothers, for increasing mother and child

care services, for the institution of the honourable title of Mother Heroine, and for awarding the Motherhood Glory Order and the Motherhood Medal."

In the ten years since the act was passed the state allocated vast sums of money as benefits for mothers with large families and single mothers. In 1953 alone, benefits to the sum of 6,500 million rubles were paid out. From year to year the number of mothers with large families awarded the honourable title of "Mother Heroine" is increasing, and has now reached 41,000. Over four million women have been decorated in the U.S.S.R. with the order Motherhood Glory and the Motherhood Medal.

Thanks to this solicitude and aid on the part of the state, mothers with large families are able to give their children education. The case of Mother Heroine Beisaliyeva from the Kazakh S.S.R. is worth citing. In the last few years she has received from the state grants of 40,000 rubles in money to give her children education. Her eldest son took part in the Great Patriotic War, received college education and works at the Academy of Sciences of the Kazakh S.S.R., the second son Abel died the death of a hero, defending his country; one of her daughters Nuriya graduated in 1952 from the Kazakh State University and is taking now a post-graduate course; another daughter Kenes studies at a conservatoire, yet another daughter Sofya teaches at school, and the other children attend secondary school.

In 1954 budget provided for an expenditure of 395 million rubles out of social insurance funds as grants on the birth of children to be paid to women workers and employees.

In the Soviet country mothers are surrounded with care, respect and love. The law guards the conditions of their work and protects their health. A five-week maternity leave before confinement and six-week leave after confinement help to strengthen the organism of the woman worker and enable her to devote all the necessary time and attention to the new-born baby.

Nursing mothers are allowed extra intermissions in their work for nursing their children and are given money grants for nursing.

Expectant and nursing mothers are relieved of night shifts and overtime work. Pregnant women cannot be refused work on that account, nor can their wages be reduced, and the violation of these provisions is a criminal offence. Women cannot be discharged during their maternity leave or after confinement.

A harmonious system of child health protection has been created and is perfected from year to year in the Soviet Union, which makes it possible to improve continuously the medical care of children.

Owing to their biological and physiological peculiarities children need most favourable conditions for their development, and special protection, particularly in early childhood, and beginning with the uterine period. It is for this reason that the concern for the protection of the children's health begins in our country long before they are born.

Children are the most precious treasure and the future of our country. All the children in the U.S.S.R., irrespective of nationality or residence (in town, country or in outlying districts) are fully provided with free medical service.

Medical prophylactic institutions for children and expectant mothers are links of a scientifically based system of mother and child health protection. They are inseverably bound and are instrumental in supervising directly and continuously the health of mother and child.

The combined effort of the obstetrician-gynaecologist and pediatrician to protect the health of mother and child is successfully implemented both in the scientific field and in everyday medical-prophylactic activity, beginning with supervision of the child still in its uterine period and continuing in the children's consultation centre, polyclinic, hospital, sanatorium, nursery, etc.

The moment a woman's pregnancy has been diagnosed, she is placed under the constant care of physicians and obstetrician-gynaecologists engaged at women's consultation centres whose network grows from year to year. There is not a town or rural district but has its women's and children's consultation centres. The obstetrician-gynaecologists and midwives see to it that a proper regimen be established in the work, rest and diet of the pregnant woman—this is necessary not only for her, but for her future child as well; they see to it that the course of pregnancy should be normal; in case of deviations they take measures to administer treatment and place the expectant mother into special pre-confinement wards of maternity homes.

The existing wide network of maternity homes in towns, workers' settlements and rural districts with over 150,000 beds ensures every pregnant woman with constant medical care; she is under the supervision of obstetrician-gynaecologists and midwives. The medicinal apparatus available at maternity homes and the modern methods of diagnosis and treatment of pregnancy diseases, applied in the practical work of these institutions, make it possible to render skilled attention during confinement. All this tells favourably on the systematic decrease in the number of diseases of mothers and children and on the reduction of the number of premature births and complications at the delivery. New-born babies are vaccinated according to Calmette's method at every maternity home both in town and in country.

A large network of maternity homes has been opened in collective farms, which brings this kind of first-aid within the reach of the rural woman population.

The birth of a child is a happy event in every Soviet family. The Soviet woman does not want, however, the birth of her child to be bound with sufferings or fear.

That is why our scientists, practitioners, obstetrician gynaecologists, physiologists and other specialists work hard to solve the problem of painless childbirth, and widely introduce into the practical work of maternity homes both in the towns and rural districts the method of psychoprophylactic treatment of expectant mothers before confinement. On the basis of the teaching of the great I. P. Pavlov, our experts have undoubtedly achieved certain successes in this field.

Since the network of maternity homes and similar institutions provides with medical aid every pregnant woman both at stationary medical establishments and at

home, every child is under supervision of medical workers from the very day of its birth.

The children's consultation centre—the polyclinic, is notified by the maternity home of every case of childbirth.

There are some 7,000 children's consultation centres to supervise new-borns from the very first day of their arrival from the maternity homes.

The chief task of the children's consultation centre is to instruct mothers proper nursing and care of their children; to create the conditions for their proper physical development and training; to carry on systematic dispensary supervision of the children; to render the necessary prophylactic and medicinal aid.

The work of consultation centres—polyclinics is based on the district principle of medical service of children, according to which pediatricians are in charge of districts of the children's residence. The district doctor renders the children aid in the hospital, the polyclinic and at home.

The children's consultation centre—the polyclinic actively supervises every nursing child in the district within its jurisdiction from the day of its birth. When mother and child are discharged from the maternity home, they are visited at home by the district pediatrician and visiting nurse who educate mother in rules of proper care and organization of the baby's life, proceeding from the conditions under which mother and child live.

Subsequently mother brings her child to the consultation centre which looks after its growth and physical development, and educates mother in hygiene and sanitation. The visiting nurse comes to see the child at its home not less than three times during the first month, once a month from the second to the sixth month, and once every other month after the child is six months old.

In the second year of the child's life mother brings it to the consultation centre for examination three or four times within the year, and subsequently once or twice. At the same time, when brought to the consultation centres, the children are given preventive vaccinations and inoculations at fixed periods against smallpox, diphtheria, as well as anti-tuberculosis revaccination.

The children are systematically examined for tuberculosis and are given biological tests—the Mantoux and Pirquet reactions and roentgenography. Great attention is paid to properly nursing the babies. Wide propaganda work is carried on everywhere in favour of breast feeding. In order to provide with breast milk infants whose mothers are unable to nurse, the consultation centre arranges for mothers with an excess of milk to give their excessive milk for such infants. The milk is sterilized and given out according to the doctor's prescription.

Milk kitchens are set up at consultation centres—polyclinics whose task consists in providing infants with milk and formula foods.

Patients with high temperature and acute gastro-intestinal diseases, suspected for an infectious disease, who have come in contact with infectious patients are not admitted to the children's consultation centre and are visited at home by the district doctor. The consultation centre renders the children specialized aid through phthisiologists, otolaryngologists, oculists, dermatologists, surgeons, etc.

Over 95 per cent of all infants in towns and upwards of 90 per cent of children in rural districts and collective farms are under constant medical dispensary supervision. At present there is a pediatrician and obstetrician-gynaecologist in almost every rural district.

Health education plays a prominent role in the activities of consultation centres.

Health education work is not confined to consultation centres and polyclinics at industrial enterprises; it is carried out in residential districts and at homes by physicians and visiting nurses.

To render medical aid to diseased children, special children's hospitals and children's wards at general hospitals have been set up to treat various kinds of diseases.

Proper organization of care at children's hospitals is a matter of primary importance; in combination with a rational system of diet it underlies all the therapeutical measures. In addition to treatment, the children's hospitals carry on educational work among the children.

Nurslings are often admitted to hospitals together with their mothers. In such cases the mothers are given a separate room in the children's ward.

Of special importance in the work of children's hospitals are measures to prevent intra-hospital infections. These measures include proper organisation of admittance, rigid observance of the hospital regimen and regulations for enforcing such care as rules out any infection from outside or its transmission by the medical staff, and the strictest isolation of patients suffering from infectious diseases. Diseased children whose diagnosis has not been finally fixed or insufficiently ascertained are placed in isolators or "boxes" to be treated individually.

The staff of consultation centres polyclinics includes school doctors who service schools and pre-school establishments (kindergartens).

The Soviet school doctor is a pediatrician-hygienist who carries out the whole complex of hygienic and medical-prophylactic measures contributing to greater physical development, successful studying and the entire education of children.

In co-operation with the pedagogues, the school doctor directs the proper physical training of the school children, and takes charge of, and controls the observance of sanitary and hygienic rules at school which to a great extent determine the success of school studies.

During the school year every pupil undergoes a thorough medical examination, in addition to routine prophylactic examinations. The school doctor detects children with tuberculosis infection, with rheumatism or with a weakened constitution who are in need of dispensary care; he ensures the medical and prophylactic aid with the help of experts from children's hospitals and dispensaries.

In order to prevent infectious diseases at school, the school doctor organizes and carries out, with the help of the school trained nurse various prophylactic anti-epidemic measures.

The school doctor sees to it that the studies conform with hygienic requirements. Jointly with the teachers and head of the school he establishes the sanitary and hygienic rules at school; participates in working out the time-table of the lessons; exercises medical control over the instruction and educational activities and the hygienic conditions under which they are carried out. The school doctor watches that the pupils be given desks according to their sizes; presents demands to the head of the school as to the observance of the required norms with regard to cubic capacity of classrooms, ventilation, heating and lighting; watches over the organization of rational diets and school lunches; takes part in assigning the pupils to different groups for physical exercises and examines the condition of those participating in contests and crosses.

The school doctor carries on systematic health educational work among the pupils, the personnel of the school and parents, and is helped in all his measures by the active workers of the school taking an interest in sanitary activities.

The struggle for a healthy young generation in our country has been the matter of everyday concern of the Communist Party and the Government at all the stages of socialist construction. All the organs of our state, the trade union organizations, the Young Communist League and all the Soviet social organisations pay great attention to the problems of physical development of children and their sound health. Organizing summer holidays for the children of workers and employees is one of the mass-scale health-building measures. Yearly over 5·5 million children and juveniles spend their vacations in out-of-town Young Pioneer camps and playgrounds in the towns; the children from kindergartens, nurseries and children's homes leave for country places in a body to spend their holidays there. In 1954 alone, 540 million rubles were allotted out of social insurance funds alone to provide for the summer rest of school children. Children's health protection establishments have become a habitual phenomenon in the lives of the Soviet people, and parents have come to look upon them as something indispensable in the service of children. Thousands of children yearly improve their health in the Crimean health resort "Artek".

A great part in organizing the building of the children's health is the sanatorial network of children's institutions which can accommodate over 100,000 children. There is not a single constituent republic, not a single region or territory but has its own local children's sanatoriums working either all the year round or in the summer period only. Some 400,000 children yearly improve their health in children's sanatoriums. The Soviet state spends annually huge sums of money to maintain the children's sanatoriums, and completely relieves the parents of the duty to pay for their upkeep in the children's sanatoriums and health resorts for the whole period of the children's stay there.

The children's sanatoriums are situated in picturesque spots throughout the country.

The sanatoriums are of different types: tuberculosis, rheumatic, gastric-intestinal, etc. The children's sanatoriums are medical-prophylactic establishments which provide the children above all with a sanatorial and hygienic regimen combined with maximum stay in the open air. Various modern special methods of treatment are at the same time widely applied, such as medicinal exercises, medicinal diet, etc. Alongside the educational and pedagogical work conducted among the children in the sanatoriums, walks, music and rhythmics lessons and other kinds of recreation fill the lives of the children with valuable experiences, and have a beneficial effect on their health, while enriching the children's minds with new interesting knowledge.

All the children's health resorts are furnished with up-to-date medical equipment, special laboratories, x-ray apparatus and other kinds of medical equipment; they are staffed with qualified medical and pedagogical personnel.

As a rule, such sanatoriums cater for children who have undergone a course or clinical treatment in hospitals. This produces remarkable results and leads to a complete stable recuperation and building up of the children's health. Particularly beneficial is sanatorium treatment for children who have been affected with an acute form of rheumatism. Clinical observations have shown that any lesion of the heart which has begun in the period of exacerbation of rheumatism continues more or less slowly after the acute phenomena are over as well, and this sometimes leads to an onset of the heart disease. For this reason it is advisable to transfer the child from the hospital to a sanatorium or a forest school, and not to the habitual surroundings of home. Such children should be under constant close medical supervision for quite some time, perhaps a few months.

Thus children who have suffered from attacks of rheumatism are taken as a matter of routine to children's rheumatism sanatoriums where they stay at the expense of the state from three to six months, depending on their health.

Some health resorts use balneological remedies to treat rheumatism. Carbonic acid baths are effectively applied for the treatment of rheumatism at the children's sanatorium Arzny (Armenian S.S.R.) and at the health resort Kislovodsk; radioactive baths are used at the Georgian health resort Tskhaltubo and at the health resort Byelokurikha in the Altai territory.

Soviet public health service pays great attention to the organization of sanatorium treatment of children who have undergone poliomyelitis. This is a very grave child disease, though it is not widespread in the U.S.S.R. Nevertheless Soviet public health service does its utmost to eliminate the foci and consequences of this disease.

Poliomyelitis consequences are treated at children's health resorts in the U.S.S.R. by most diverse means. In addition to the general complex of sanatorium remedies, massage, gymnastics, tissue grafting and in some cases orthopedic treatment are applied. New medicines, such as proserine (?) and dibasol, are widely used.

In cases like osseous joint and pulmonary tuberculosis, the treatment of children, administered in the conditions of a children's sanatorium from the very beginning of the disease, proves to be highly effective.

This is, above all, accounted for by the fact that along with the treatment of the basic process with all the modern methods, including antibiotics, children affected with tuberculosis are also treated with a complex of other sanatory means which increase the resistibility of the organism. In this respect the sanatorium and hygienic regimen involving the children's maximum stay in the open air plays a tremendous role.

To build up the health of the children so-called forest schools have been set up in the U.S.S.R. These are peculiar children's health resorts catering for children who have undergone some disease or other, or children with a weakened constitution. The forest schools are taken charge of by public education authorities, and the bulk of expenses to maintain them is borne by the Soviet state; the parents pay but small sums for the upkeep of their children at these schools. The school children, while recuperating and building up their health at the forest schools, continue their studies according to school curriculum.

A place of importance in the Soviet general system of mother and child health protection is held by the nursery. Nurseries are one of the most widespread child welfare institutions in the Soviet Union. The nursery is fulfilling an important state task, by enabling hundreds of thousands of working men to combine their active participation in socialist construction with the honourable duties of motherhood.

The task of the nursery consists in helping working mothers to bring up their infants (from the age of 1, 8 months to 3 years).

The nursery is the educational and health-building institution for infants, a centre of culture and a model of proper education and development of children, and a school for mothers.

The nursery does not replace the family, but co-operates with the latter to bring up the child. By organizing nurseries, the Soviet state does not relieve the family, the parents, notably the infant's mother of the care for, and the responsibility of, the infant's upbringing.

The wide network of children's nurseries now existing in the U.S.S.R. helps a vast number of families to bring up infants and practically enables the women to work and study, thereby ensuring their status of equality both in family and society.

The Five-Year Plan of the Development of the U.S.S.R. for 1951-1955 provides for an increase in the accommodation capacity in children's nurseries by 20 per cent.

According to the decision of the Government, adopted in 1949, children's nurseries, at the rate of accommodating 12 children for every 100 working women, are to be set up at every newly-built plant, factory or other industrial enterprise employing no less than 500 women.

Every working woman, if she so wishes, can leave her infant at the nursery while she is at work. The nurseries are maintained at the expense of the state, and the parents pay but a small sum, in proportion to the earnings of the family, to cover a part of the maintenance charges.

About a million children are accommodated in nurseries in the towns and rural districts of the Soviet Union.

At present the forms of organizing nurseries recognized in the Soviet Union to be the most rational are of the following two types: (1) nurseries intended to accommodate infants of working women of a definite industrial enterprise; these are invariably built near the given enterprise; (2) nurseries built in the district of residence of mothers.

The organization of nurseries near the industrial enterprises is dictated by the necessity of keeping up breast feeding by mother and is the most effective measure to avoid early weaning away and early unjustified additional feeding during the weaning period.

Working women are entitled to intervals for nursing every three and a half hours, and their duration must not be less than half an hour.

The nurseries are housed in buildings specially constructed for the purpose as well as in premises fitted out to accommodate the nurseries. They are supplied with special furniture to accord with the size and age of the children.

Mothers bring their children daily before leaving for work. In the reception room trained nurses examine the children to see that none of them is affected with any disease. If any of the children arouses suspicion as to some disease, it is taken to a compartment. There the child is examined by a physician, and if the latter finds that the child's disease is not infectious or does not require any hospital treatment, the child is taken to a nursery isolator for treatment; after recuperation the child is taken back to its group.

In the nurseries the children are divided into groups. The smallest of them, the nurslings, aged from one and a half to nine months, are placed in one and the same group. They are serviced by the most qualified physicians and nurses.

Each group has at its disposal its own unit comprising a waiting-room, dining-room, play-room, bedroom, and verandah.

Properly organized educational work is of extraordinary significance for normal children in nurseries. The normal development and functioning of the higher nervous activity is of major importance for the all-round physical and neuropsychic development of the child. Such development is attained by a proper regimen of sleep, wakefulness and diet conforming with the physiological peculiarities of each age group, as well as by measures which contribute to, and stimulate the growth and development of the child.

Important work is done in the nurseries to prevent children's infectious diseases from being brought from outside. Specially-trained visiting nurses come to see the children in their homes to find out their state of health and familiarize themselves with the living conditions of the children. They instruct the mothers on the subject of properly educating their children.

The proper organization of the children's diet is one of the important tasks of the nurseries, the diet to consist of high-grade foodstuffs which meet the physiological requirements of the children. Nurslings are ensured

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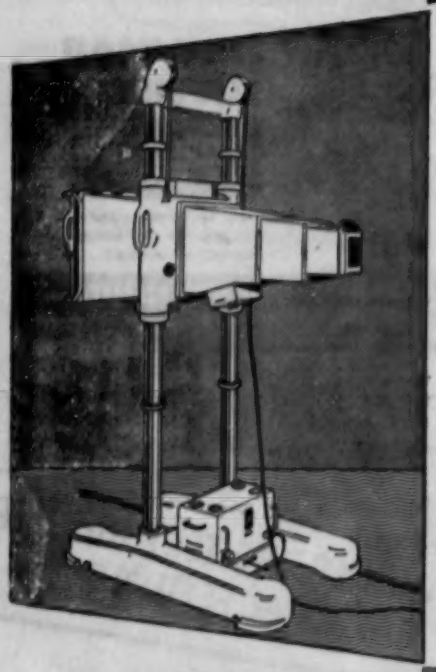

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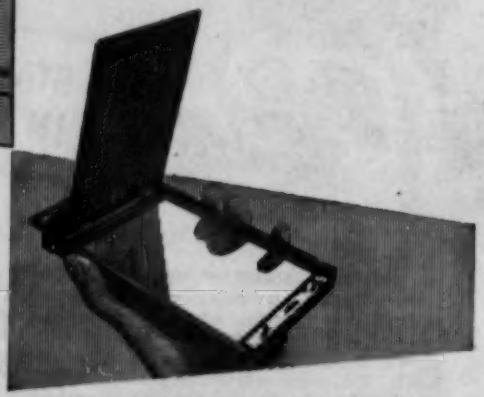

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A nursery council is set up in every nursery consisting of representatives of mothers and social organizations. It is the task of the councils to exercise public control over the work of the nurseries and the proper accommodation of the children.

In order to take care of the collective farmer children in the periods of field work, seasonal nurseries and children's playgrounds are set up in the collective farms, in addition to those existing on a permanent basis. The children's seasonal institutions are fully maintained by the collective farms themselves, the boards of the collective farms earmarking special appropriations for this purpose out of their budgets. Medical care of the children accommodated in seasonal children's nurseries is given by the medical workers of the health service establishments. Nursery heads and educators are given special training according to a fixed curriculum so as to ensure the servicing of the children.

The duration of work of the seasonal children's institutions is determined by the collective farm board depending on the conditions of work of the mothers in the collective farm.

Special children's homes have been set up in the U.S.S.R. to bring up parentless children as well as children of single mothers who are temporarily in difficult financial conditions, or in the case of mother's illness, when the family is unable to take proper care of the child. All the conditions have been created in the children's homes for the normal physical and neuropsychic development of the inmates. The children's home is a real medical and educational establishment which means another family to the child. The sickness and death rates have been reduced to the minimum in the children's homes. The homes are fully maintained at the expense of the state. Councils have been set up in the homes to exercise control over the organization of work and education of the children there.

Thirty four thousand children's doctors are at work, protecting the health of the children. The number of pediatricians is growing from year to year. Special pediatric faculties to train children's doctors have been set up at medical institutes where the students, these would be doctors, take a six-year course in all the branches of pediatrics. The State Pediatrics Medical Institute, founded in Leningrad in 1925, has been graduating yearly hundreds of highly-skilled children's doctors. Special scientific research institutes have been set up throughout the country devoted to child health protection. These institutes, headed by the Pediatrics Institute of the U.S.S.R. Academy of Medical Sciences have greatly contributed to the progress of medical science in the realm of child health protection by working out the theories on the child, on prophylaxis and treatment of child diseases, and by elaborating and putting into practice the best forms of medical service for children.

The scientific research institutes have evolved a system of bringing up infants based on the theory that the higher nervous system of the infant starts its marked functional activity already by the end of the first month of its life.

With Pavlov's physiological teaching as a basis, new laws are being discovered which provide scientific substantiation of the children's upbringing. Particularly valuable in this respect are the investigations made by N. I. Krasnogorsky, a member of the U.S.S.R. Academy of Medical Sciences and one of the most distinguished physiologist-pediatrists in the country, on the higher nervous activity of children. Important work has been performed by our scientist-pediatrists and leading public health workers in combating children's pneumonia, gastric-intestinal and infectious diseases. New medicines are one of the most important achievements of Soviet pediatrics in recent years. All that has been worked out by the scientific research institutes becomes within the reach of the masses of physicians. Such is the law of Soviet public health.

The scientific research institutes, besides elaborating problems of child physiology and pathology, do important work in resolving the problems of better organization of medical service for children throughout the country.

The Pediatrics Institute, in co-operation with architects and workers of the Sanitation and Hygiene Service, has worked out model plans for the building of medical-prophylactic institutions for children; has studied and scientifically substantiated the sanitary and hygienic norms of maintaining and equipping children's institutions. Models of furniture and garments for children have been worked out which contribute to the proper physical development of children, etc.

As a result of the continuous improvement of the material conditions of the population and the sanitary measures for child health protection that are carried out on a wide scale, birth rate has greatly increased since the war while child mortality has been steadily decreasing from year to year.

The annual net increase of population in the U.S.S.R. has in the last few years exceeded the rate of 1940, and during the last three years the population has increased in all by 9·5 million.

The physical development of children has considerably improved. According to a number of scientific research mother and child health protection institutes in Moscow, Leningrad, Kiev and other towns, the babies born in 1953 have greater weight and size of the chest than those born in 1938-40, and similarly school children surpass those born in 1940 in size, weight and the circumference of the chest.

Such diseases as plague, smallpox, cholera and relapsing fever have been completely eliminated in the U.S.S.R. A great reduction in the number of other infectious cases has been recorded, and particularly in the incidence of typhus and malaria. The number of typhus

cases has been reduced to solitary instances; malaria as a mass-scale disease has been done away with; the sickness rate of children for infectious diseases as well as for pneumonia has been diminished; the death rate in all cases of child diseases has been drastically reduced.

These successes in eliminating or reducing the sick rate of a number of infectious diseases have been reached as a result of the steady rise in the material welfare and cultural standards of the Soviet people and the mass-scale prophylactic measures carried out by the public health authorities.

The entire network of medical establishments and a number of ministries (the Ministry of Municipal Services, the Ministry of Agriculture and others) as well as the population have been enlisted to help in carrying out sanitary and anti-epidemic measures. Representatives of the people who are interested in hygienic work render the public health authorities great help in the timely detection of infectious cases and in eliminating shortcomings in hygiene.

The whole of the sanitary and anti-epidemic work is carried out according to a plan in which prophylactic measures play a predominant part.

Such, in brief, is the system of child health protection in the Soviet Union.

A great deal has been attained by the Soviet people in child care services, but there is no limit to any accomplishment, and we are striving to improve and perfect to a still greater degree the medical service of children.

NOTES AND NEWS

Radioactive Isotopes for Research Purposes

The progress made in the use of radioactive isotopes for industrial and research purposes was well illustrated by an exhibition held recently at the Birmingham Exchange and Engineering Centre.

An example of how costs could be reduced was provided by specimen radiographs. These were produced by using an inexpensive source of gamma radiation instead of an x-ray plant. Radiography is also possible in situations where the x-ray equipment could not be used because of its size, as for instance in a small-bore tube. The container and source of radioactive material are so small that they can be inserted in very confined spaces, and if a photographic film is wrapped round the outside of the article, a radiograph is produced easily and cheaply. Examples were shown of means of detecting leakage by using a soluble radioactive tracer, of wear-measurement by rendering the wearing surface radioactive, and of the measurement of the movement of mud in river estuaries. Continuous thickness measurement of sheet or strip material such as metal, paper, linoleum, etc., was demonstrated by apparatus which measures the attenuation of beta radiation passing through the strip or sheet.

There are no security restrictions on the use of radioactive isotopes, and to assist prospective users who have no experience in their practical application, the Atomic Energy Research Establishment runs an isotope school giving instruction in both theoretical and laboratory work. It is open to students from the U.K. and overseas.

Information about isotopes and the various services provided by the Establishment can be obtained on request from the Isotopes Information Officer, Atomic Energy Research Establishment, Harwell, near Didcot, Berkshire.

Nutrition Society of United Kingdom

The following is the provisional programme of the symposium to be held in Oxford on July 8 and 9, 1955, on

The Nutritional Work of FAO, WHO and UNICEF

Session I: Friday, July 8 (afternoon)

Chairman: Major-General Sir Robert McCarrison, C.I.E. (Oxford).

Dr. P. Dorolle (Geneva) will speak on international co-operative activities in the field of nutrition; Dr. W. R. Aykroyd (Rome) on the nutritional work of FAO; Dr. R. C. Burgess (Geneva) on the nutritional work of WHO.

Session II: Saturday, July 9 (morning)

Chairman: Dr. H. M. Sinclair (Oxford).

Dr. C. A. Egger (Neuilly-sur-Seine) will speak on the nutritional work of UNICEF; Miss M. A. Ross (Cairo) on home economics and nutrition in Egyptian villages; Dr. S. Postmus (Rangoon) on nutrition services in Burma.

Indian Scientists to Study Health Problems in China

A delegation of Indian scientists, led by Dr. M. L. Ahuja, Director, Central Research Institute, Kasauli, left for China on 28 May 1955 to study public health problems in that country, at the request of Government of China.

Dr. Ahuja, leader of the delegation, said that members of the delegation were glad to have this opportunity to learn at first hand how modern China was meeting the challenge of infectious disease and administering medical relief. Such visits, he said, had a very healthy influence on the development of research.

He added: "The close cultural affinity and historical connexions between India and China date back to a remote past. The basic needs and the ways of life of the two peoples are similar. Both countries are comparatively underdeveloped and both have to face similar problems of primary production and food shortage, lack of social services and inadequacy of medical and preventive health measures. Because of these and of the identity of our ideals and interests we feel for each other increasingly."

Members of the delegation are: Dr. R. N. Chaudhuri, Director, School of Tropical Medicine, Calcutta; Dr. Jaswant Singh, Director, Malaria Institute of India, Delhi; Dr. K. V. Krishnan, Director, All-India Institute of Hygiene, Calcutta; and Dr. V. N. Patwardhan, Director, Nutrition Research Laboratories, Coonoor.

Recruitment of Civilian Medical Practitioners

The Union Defence Ministry announced recently (on 29 May, 1955) that recruitment of civilian medical practitioners for appointment to direct permanent regular commissions in the army medical corps will in future be through a competitive written examination conducted by the Union Public Service Commission. The written test will be followed by practical professional tests and interview by the Army Medical Corps Selection Board. The first written examination is likely to be held in September, 1955.

Leprosy Treatment in Banaras

The U. P. Government has selected Raja Kalishanker Leper Asylum, Banaras, to be run as a subsidiary centre for the treatment of leprosy under the Government of India Leprosy Control Scheme. In addition to necessary equipment Raja Kalishanker Asylum has 45 beds also.

This subsidiary centre will serve in particular the eastern districts of Banaras, Jaunpur, Ghazipur and Ballia.

Mobile units of the centre will tour their respective areas and send contagious and other deserving cases to hospital for treatment. They will also arrange for treatment of the non-contagious and simple cases at their homes.

These units will also educate people on the causes of leprosy and try to remove popular misconception about the disease.

Isolation of leprosy cases has hitherto been the chief method of control of leprosy in endemic cases. With the discovery of sulphone therapy, the treatment of leprosy has become a more practical proposition.

The Government of India proposed to establish a few pilot projects in the country for the control of leprosy by the application of the intensive mass treatment method in certain cases.

"Ames Awards" of the American College of Gastroenterology

All papers submitted must represent original work in Gastroenterology, must not have been previously published except for abstracts or short preliminary reports and must not have been previously presented at any National meetings. The contents of the papers can be clinical or basic science. Clinical papers must not be case records, but controlled clinical work. All entries must be typewritten in English, double-spaced on one side of the paper and submitted in *six copies*.

The winning entry will be selected by the Research Committee of the American College of Gastroenterology and the award will be made at the Annual Convention Banquet of the College, to be held in Chicago, in October 1955. The paper selected for award becomes the property of the American College of Gastroenterology and the decision of the judges will be final. The recipient of the first prize will present his paper *in person* at the Annual Meeting of the College. All unpublished entries must be received not later than *1 September 1955* and should be addressed to the Research Committee, American College of Gastroenterology, 33 West 60th St., New York 23, N.Y.

CORRESPONDENCE

The Editor is not responsible for views expressed by correspondents.

Plea for Privilege to Family Physicians to see their Patients in Hospital

SIR,—A general practitioner now-a-days is not allowed to see his patient in the hospital outside the usual visiting hours, except by courtesy of the visiting staff if he happens to be personally known. Thus he is deprived of the opportunity of having an accurate diagnosis made of his patient's illness, though as his family doctor he is anxious to have it.

I hope the President of our Association will take up the matter with the present government and have the existing rules amended for the convenience of family physicians visiting their patients in the hospital. I understand doctors in other countries have more privileges in matters like this. When Dr. B. C. Roy is at the helm of affairs, I think red-tapism and bureaucratic temperament of old days should have a good bye. I am etc.

N. N. CHATTERJEE, M.B.

21/B, Garden Reach Road,
Calcutta.

Single Dose Treatment of Malaria

SIR,—I have gone through the interesting paper titled "Single dose treatment of Malaria" by Prof. R. N. Choudhury and B. N. Dutta published in the Journal of the Indian Medical Association, Vol. 24, No. 13 (April 1, 1955).

I would like to add a few words about the 'popular' single dose treatment of malaria with 4 tablets of chloroquine. I have treated 34 malaria patients with the above mentioned method. The untoward reaction was found in 10 cases (11 per cent). Moreover, I have seen two cases of self-medication, where unfavourable symptoms developed, which required active interference. The untoward reactions noticed by me differed to some extent from the experience of the learned writers. Untoward reactions seen may be classified into two groups (*a*) neurological type, (*b*) gastro-intestinal type. Total number of cases—12.

Unfavourable symptoms

				No. of cases
(*a*) Neurological type :				
1. Heaviness of head	...	...		10
(*a*) Severe	...	...	... 2	
(*b*) Moderate	...	...	... 3	
(*c*) Mild	...	...	... 5	
2. Vertigo	...	...	...	6
3. Lethargy and weakness			...	6
4. Insomnia	...	...	...	2
5. Fleeting burning sensation all over the body	...	...	...	1
6. Ambylopia (Mild)	...	...		1
(*b*) Gastro-intestinal type :				
1. Loss of appetite	...	...		3
2. Intestinal colic and diarrhoea	...			2
3. Vomiting	...	...	...	1

Fifty per cent of the cases showing unfavourable neurological symptoms had early signs of deficiency of vitamin B group, which I unfortunately did not take into consideration at the time of institution of the 'popular' single dose treatment of malaria with chloroquine. Early signs of deficiency of vitamins belonging to B group were manifested by slight angular stomatitis ariboflavinosis), and painful tingling sensation in the lower limbs after giving a slight amount of pressure on anterior tibial nerve at the neck of fibula (hypovitaminosis B_1).

All the neurological symptoms disappeared after administering highly concentrated vitamin B complex tablets. So it seems to me that the rest of the cases having no definite signs of deficiency of B complex vitamins had subclinical deficiency of vitamins belonging to B group.

In order to avoid the untoward neurological reactions, it is my practice now to administer vitamin B complex tablets simultaneously with chloroquine tablets. But in the cases with manifestations of deficiency of vitamins belonging to B group, I am not in favour of institution of this single dose treatment of malaria with chloroquine.

Allergic diathesis was found in one of the cases of gastro-intestinal upsets. Gastro-intestinal upsets can be usually avoided if the chloroquine tablets are swallowed with two tablets of "sodamint" or "ptychosoda", moreover, gastro-intestinal upsets can also be avoided in most of the cases, if the chloroquine tablets are swallowed fifteen minutes after taking a glass of 'sarbet' (sugar-candy water).

This is the lesson, which I have learnt from the single dose treatment of malaria with chloroquine.

Lastly, chloroquine is a very powerful weapon to check the menace of malaria but its judicious use is essential. I am etc.

DEBABRATA PAL.

Sevayatan,
Jhargram.

REVIEW

The Casualty Department —By T. G. Lowden, M.A., B.M., B.CH., F.R.C.S., Consultant Surgeon, Sunderland Royal Infirmary with 170 illustrations 12 in full colour. Printed in Great Britain by R. & S. Livingstone Ltd., Edinburgh and London, 1955.

The Casualty Department, a book on casualty service, has been a good production by Mr. T. G. Lowden of Sunderland Royal Infirmary. In short he has dealt with almost all the problems in a surgical out-patients' department with great stress on the casualty service. The problems have been solved in a very practical way. In this particular aspect, the book may be a little stiff to the beginners in the line i.e., newly recruited junior members of the staff. The author would do better to give little more details of the steps. The idea of the treatment of the abscess with removal of all the granulating membrane and closure of the cavity under proper antibiotic cover is certainly a novelty. Since I read this book, I have tried the same in selected instances and the results were satisfying. The author's idea of doing as few dressings as possible is not only a boon to the patients but also to the department. It is really gratifying to find him stressing so much on this point and on the point of keeping the dressings dry all the time. The chapter named, 'Cold Case' is a bit misleading. One may think that he will find problems of Frostbite or Immersion syndromes dealt in it. As the author rightly remarks that no surgery is static, he should make some provisions for timely alterations and additions instead of changing on edition every 3 or 4 years creating a lot of waste as happens in most other medical publications.

As a whole the book is worth reading by all members of the house staff—junior and senior as also casualty officers. It goes without saying that medical libraries and institutes should not be without a copy.

YOUR QUESTION

Correspondents should give their names and addresses (not necessarily for publication) and include all relevant details in the questions which should be typed. Questions of medical interest only will be acceptable for this section. They should be sent in a separate envelope marked "Your Questions." Questions of general interest will be published in preference. Lack of space precludes answering of all the questions received.

Q. What is the best method and dosage of administration of paraldehyde in the management of eclampsia?

Ans. The best method of administration of paraldehyde is by intramuscular injection. The dose varies from 6 to 10 c.c. repeated 4-6 hourly, depending on the weight and the build of the patient. One should not however push more than 30-40 c.c. of paraldehyde in 24 hours. Though the drug does not require to be sterilized yet all precautions should be taken so far as the syringe and the needle are concerned.

While injecting, the following technique should be followed in order to prevent blistering of the skin at the site of injection. On the outer part of thigh, or in the gluteal region an intramuscular needle (gauge 11) should be stabbed after preparing the skin. The syringe is to be charged separately with the required amount of paraldehyde in which ½ to 1 c.c. of air has been drawn in and then connected with the needle and held vertically. The drug is slowly injected after testing that the point of the needle is not in a vein. When the paraldehyde has been instilled, the air is pushed through, and the needle is withdrawn quickly. Massaging is not necessary. Paraldehyde rectally causes irritation and if leakage occurs may cause blistering of perianal skin.

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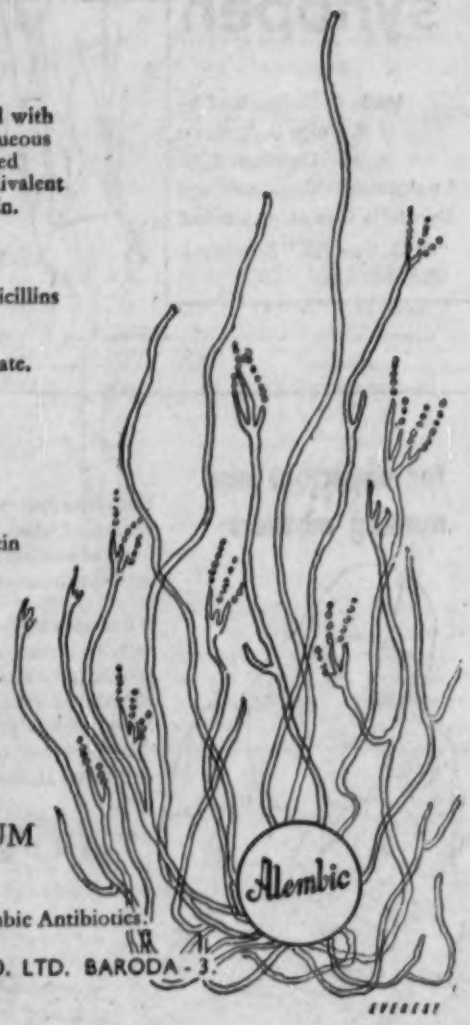

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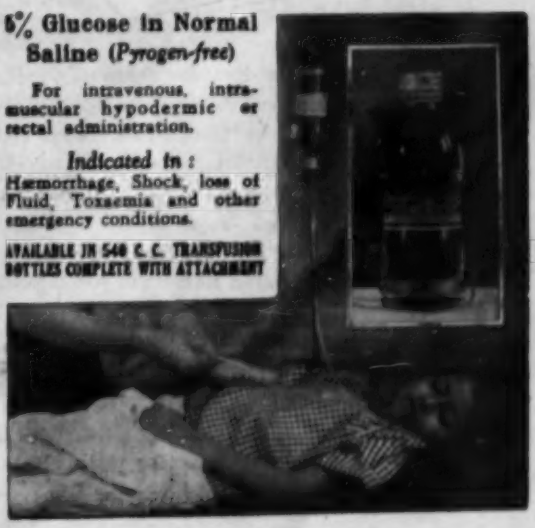

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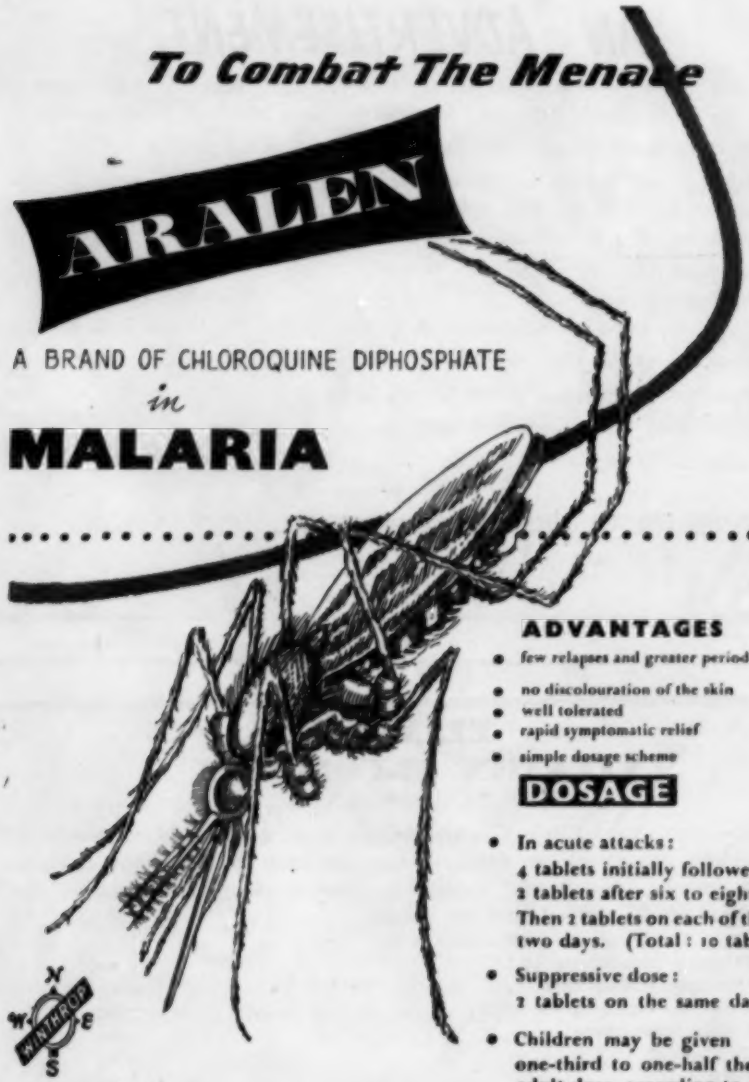

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